#1

N.A.A. BULLETIN

December 1960

In Two Sections
Section 1

CONTENTIONS AND OPINIONS ON

R.O.I. Methods

Financial Lease Disclosure

Income Tax Allocation

NATIONAL ASSOCIATION OF ACCOUNTANTS
LIBRARY

INVENTORY CONTROL TECHNIQUES

N.A.A. BULLETIN

Vol. XLII No. 4 DECEMBER, 1960

Contents

– Installing, Evaluating and Reporting –

Page

INSTALLING A STANDARD MATERIAL COST PROGRAM by ROBERT BISSET

Undertaken to provide better information on material purchase price variances, the program described in this article has also brought to light undetected discrepancies in purchase costs of similar items ... 79

DEPARTMENTAL UNIT COST PLAN IN AN INSURANCE COMPANY by ROY K. COWAN

Only two cost elements—salary and equipment rental expense—are included in the computation of departmental unit cost, yet, as disclosed in this article, through a set of reports generated by the plan, which recognizes time as the common denominator for performance measurements, a constant basis in evaluating the departmental performance can be established and, partly by implication, a comprehensive portrayal of overall activity evolved 53

This *Bulletin* is published monthly by the National Association of Accountants, 505 Park Ave., New York 22, N. Y. Subscription price $10 a year, for members only. Second class postage paid at New York, N. Y.

COPYRIGHT 1960 BY THE NATIONAL ASSOCIATION OF ACCOUNTANTS
(Founded in 1919 as the National Association of Cost Accountants)

RESPONSIBILITY REPORTING TO MANAGEMENT

by JAMES A. DEVILLE

With its roots in the company's budgeting procedures, the system here described flowers in early reporting of monthly results by sales, plant and warehouse, and office responsibilities. Featured in the article is a profit responsibility summary which focuses attention on performance and increases interest in supplementary detailed reporting 31

— Financial Statement Considerations —

FINANCIAL LEASES BELONG ON THE BALANCE SHEET

by JACK RHODES

It is the contention of the present author that leases used to acquire fixed assets which would otherwise need to be debt financed stand in the same relationship to the financial statements, involving both a balance sheet asset and a liability. He suggests that revision of practice in this area is urgently needed 83

INCOME TAX ALLOCATION IN FINANCIAL STATEMENTS — OCCASIONS AND OPINIONS

by SAMUEL L. READY

Devoting most attention to income tax allocations between accounting periods—requiring a related tax deferral (debit or credit) on the balance sheet—the author of this article enumerates situations which may justify such presentation, whether related to cost or income items, cites opinion for and against the treatment, and concludes that income tax allocation has a useful future 19

— Methods and Techniques —

INVENTORY MANAGEMENT — AN APPLICATION OF THE EXCEPTION PRINCIPLE

by DOYLE W. SELDEN

The need to reduce the number of Navy aircraft grounded for repair parts sparked the more-than-nationwide program described here. Under this new program, mechanized frequent processing of repair parts records is supplemented immediately by evaluation of exceptions to adequate stock—and by prompt and aggressive corrective measures. The author views the program as widely adaptable to inventory control problems 43

SOME FALLACIES IN FIGURING RETURN ON INVESTMENT by ROBERT N. ANTHONY

Whether related directly to the technique or affecting its use indirectly, through misconceptions concerning comparative merits of alternative methods, the controversial points discussed here, all have considerable bearing on current practice in computing return on investment. In the author's view, certain basic, well-established interpretations appear fallacious when analyzed properly 5

RAPID REFERENCE CHARTS FOR ECONOMICAL PRODUCTION ORDER QUANTITIES

by ROBERT H. OLINE

Converting the conventional formula for economical run quantities to a simplified form through use of constant values for inventory carrying and paperwork processing costs, this company also applied simplifying techniques in construction of charts from which to read the remaining variables 75

DEVELOPING ORDER POINTS AND QUANTITIES FOR INVENTORY CONTROL

by R. P. CARROLL AND F. E. SCHNEIDER

As an account of problems confronted and a demonstration of workable solutions developed, the article may serve as an incentive toward wider application of various objective devices to inventory control 67

— Some Current Matters —

Direct Costing and the No-Value Inventory by PAUL H. VAN NESS 51

It's the Situation—Not the System—That Counts by JOHN P. KIDNEY 74

Sampling and Statistics in Accounting Practice by HAROLD W. FOX 66

Maintenance of Adequate Tax Records by MARY LANIGAR 14

BEYOND THESE COVERS 92

Some Fallacies in Figuring Return on Investment

by ROBERT N. ANTHONY

WE HAVE COME a long way since 1947 when N.A.A. discussion forum material was illustrated by a replacement cost problem solution in which the annual accounting costs associated with the present machine, including its depreciation, were compared with the annual accounting costs of using the new equipment. Actually, most of the changes have occurred in the past five or six years. I doubt that anyone would argue today that book depreciation on the existing equipment should be taken into account in an investment decision, except as it affects income tax calculations; we would all agree it is the cash associated with the proposition that is the crucial fact. And most of us would now agree that a problem of this type cannot be solved without taking into account the time value of money. But it is almost inevitable that, when a technique gains widespread acceptance over a time as short as five years, problems and misuses creep in. Some of these problems and misuses in current practices in computing return on investment form the subject matter of this article.

Basic Concept of Return on Investment

Let us start with a statement of precisely what is meant by the term, "return on investment," because much of the disagreement as to the best way of analyzing problems arises from implicit differences in the way this term is used or interpreted by various people.

Everyone would agree that, if Company A lends someone $1,000, receives $80 interest a year for five years (or indeed any number of years), and at the end of that time receives back the $1,000, it has earned a return of 8 percent. Each year it has earned 8 percent on the money at risk that year. This can be calculated either by the simple process of dividing $1,000 into $80 or by finding the rate at which the future payments have to be discounted in order to equate their present value to the initial $1,000. This concept—that return on investment is the rate earned on the funds *at risk* each year—is basic and underlies all the later calculations.

ROBERT N. ANTHONY, Boston Chapter, 1941, is Professor of Business Administration at the Harvard Business School. Professor Anthony is a well-known writer on management accounting; he has authored several books and many articles.

But in the typical business investment in a new machine or in the assets required to launch a new product, the investment is *not* paid back at the end of time period; therefore, the stream of annual earnings must be large enough both to provide for profit and to recoup the investment itself. This is so because, unless the investment consists entirely of land or of working capital, we cannot expect to recover the investment at the end of the project as in the case of a simple loan. Nevertheless, the return on this investment can be calculated by the same technique, since this technique automatically takes into account the recouping of the investment.

Return on Investment Calculation

Year	Earnings in that year (a)	8% Discount Factor* (b)	Present Value (a x b)
1	$250	0.926	232
2	250	0.857	214
3	250	0.794	198
4	250	0.735	184
5	250	0.681	170
		Total Present Value	$998

Proof:

Year	Total Earnings (a)	Return at 8% of Investment Outstanding (b)	Balance, to Apply Against Investment c = (a-b)	Investment Outstanding End of Year (d)
0	$...	$...	$...	$1,000
1	250	80	170	830
2	250	66	184	646
3	250	52	198	448
4	250	36	214	234
5	250	19	231	3*

*Due to rounding

EXHIBIT 1

Exhibit 1 shows such a calculation for an investment of $1,000 and anticipated cash earnings of $250 a year for five years but no residual value. (Income taxes are ignored in the interest of keeping the numbers simple.) By a trial of various discount rates, we discover that the present value of the five $250 payments equals $1,000 when discounted at a rate of eight percent, and that the return is, therefore, eight percent. The proof of this fact is given as part of the exhibit. There is absolutely no other way of obtaining this return; we *must* take

the present value of the future payments into account in order to find the true return or, as it is coming to be known, the time-adjusted return.

In the remainder of this article some of the fallacies that have grown up around this basic idea will be discussed.

First Fallacy: Ignoring Income Taxes

The first fallacy is that of ignoring income taxes. It is sometimes said that, since income taxes take approximately 50 percent of profit, the return after taxes equals 50 percent of the return before taxes. Even the simple illustration which follows, shows that this is not so:

Annual earnings before taxes	$250
Depreciation	200
Net income subject to tax	50
Tax at 50%	25
Net income after tax	25
plus depreciation	200
Cash earnings after tax	$225

Depreciation shields the cash earnings from the full impact of the income tax and cuts the earnings—not in half but only by some considerably lesser amount. In this case, the after-tax earnings would figure out to somewhat more than four percent. When we realize the necessity of taking into account the effect of accelerated depreciation, of gains or losses on the sale of existing equipment and other tax considerations, we see that there can be no simple relationship between the pre-tax and the after-tax return. The only safe procedure is to figure the effect of taxes in each case. We will leave the matter of income tax with this brief mention. In the interest of simplicity, income tax calculations are ignored in the examples used in illustrating other points.

Second Fallacy: Present Value Is Too Complicated

The second fallacy, and a much more important one as a practical matter, is the belief that present value techniques are too complicated to be of use to the businessman. Even some authors still consider it "complex and difficult" or advise the practical businessman to use a more "feasible" method, i.e. the accounting return.

To me, this advice completely disregards the realities of the work involved in various phases of analyzing a proposed investment. The "tough" part of such

an analysis is always the collection of the underlying estimates. The analyst must make these estimates whether or not he used present value techniques to put the numbers together at the final stage of the calculation. So the problem of making good estimates is in no way peculiar to the present value approach. However, the present value technique does require a little more time in putting the figures together, perhaps a minute or two in some situations, an hour or two for a very complicated major expansion program. Nevertheless, if by spending a few extra minutes or hours, we can improve considerably the validity of the figures on which an important decision must be based, figures that may have required dozens or hundreds of man-hours to assemble, it seems worth doing.

To emphasize the insignificance of the extra time required, let me illustrate a short cut which can be used in any situation where the stream of earnings is relatively level. Simply take the earnings and divide them into the investment (in our example—$1,000 ÷ $250 = 4). Then, using a present value table, like the one a portion of which is shown in Exhibit 2, run along the row of figures according to the period of time the project is expected to last, in this case, 5 years. Stop at the number closest to 4. The heading of this column indicates the return on the investment, 8 percent.

PRESENT VALUE OF $1 RECEIVED ANNUALLY FOR N YEARS

Years (N)	1%	2%	4%	6%	8%	10%	12%	14%	15%	16%	18%	20%	22%	24%	25
1	.990	.980	.962	.943	.926	.909	.893	.877	.870	.862	.847	.833	.820	.806	
2	1.970	1.943	1.886	1.833	1.783	1.736	1.690	1.647	1.626	1.605	1.566	1.528	1.492	1.457	
3	2.941	2.884	2.775	2.673	2.577	2.487	2.402	2.322	2.283	2.246	2.174	2.106	2.042	1.981	
4	3.902	3.808	3.630	3.465	3.312	3.170	3.037	2.914	2.855	2.798	2.690	2.589	2.494	2.4	
→ 5	4.853	4.713	4.452	4.212	3.993	3.791	3.605	3.433	3.353	3.274	3.127	2.991	2.864	2	
6	5.795	5.601	5.242	4.917	4.623	4.355	4.111	3.889	3.784	3.685	3.498	3.326	3.167		
7	6.728	6.472	6.002	5.582	5.206	4.868	4.564	4.288	4.160	4.039	3.812	3.605	3.416		
8	7.652	7.325	6.733	6.210	5.747	5.335	4.968	4.639	4.487	4.344	4.078	3.837	3.6		
9	8.566	8.162	7.435	6.802	6.247	5.759	5.328	4.946	4.772	4.607	4.303	4.031	3.		
10	9.471	8.983	8.111	7.360	6.710	6.145	5.650	5.216	5.019	4.833	4.494	4.192	3.		
11	10.368	9.787	8.760	7.887	7.139	6.495	5.938	5.453	5.234	5.029	4.656	4.327	4.		
12	11.255	10.575	9.385	8.384	7.536	6.814	6.194	5.660	5.421	5.197	4.793	4.439	4.1		
13	12.134	11.343	9.986	8.853	7.904	7.103	6.424	5.842	5.583	5.342	4 910	4.533	4.2		
14	13.004	12.106	10.563	9.295	8.244	7.367	6.628	6.002	5.724	5.468		4.611	4.28		
	13.865	12.849	11.118	9.712	8.559	7	11	6.142	5.847	5.57		4.675	4.31		
		578	11.652	10.106	8			6.265	5.954						
			12.166	10.477					6.0						

EXHIBIT 2

When flows are uneven, this method will not work, but it only takes a few minutes more, and never more than three trials, to find the true return in such cases, to the nearest percent. There is no point in these problems in coming any closer than the nearest percentage, since the underlying estimates are not exact, anyway.

Third Fallacy: The Higher the Return, the Better the Project

The third fallacy is much more subtle. The return computed above is indeed the true return. One might think that the higher this return, the better the project. In most cases this is true but here are some important exceptions. Let us rule out all the unmeasured factors, the intangibles that must be taken into account as extremely important in choosing investment projects, and focus only on the numbers.

The High Return Project Is Not Necessarily Better

	A	B
Investment	$1,000	$1,000
Annual earnings	1,200	300
Life	1 year	5 years
Return on Investment	20%	15%
Profitability at 10%	$1,091	$1,137
Profitability index	1.09	1.14

EXHIBIT 3

Exhibit 3 shows two projects, each requiring an investment of $1,000. Project A will earn $1,200 for one year and Project B will earn $300 for each of five years. A computation of the time-adjusted return on these two projects would show a return of 20 percent for Project A and 15 percent for Project B. But

Project A is not necessarily better than Project B. It all depends on what the company can do with the funds released from Project A at the end of its life, i.e., at the end of the year. If no very good opportunities for investment will exist at that time, Product B may be more desirable because the funds are tied up for a longer time and earn a quite satisfactory return over the whole of the longer period.

There is a simple method for solving the problem. We call it the *profitability method,* because this was the term given to it by Bell Telephone Company engineers several years ago. It involves discounting the stream of earnings at the rate the company can reasonably expect to earn on future investments. Assuming this expected earnings rate to be 10 percent, the present values turn out to be $1,091 in Project A and $1,137 in Project B. The profitability index is found by dividing the present value of the earnings by the investment, $1,000. The result shows that, despite its lower return on investment, Project B, with an index of 1.14, is better than Project A, with an index of 1.09. This is a valid conclusion.

The problem illustrated above arises whenever two projects with different lives, or with the same lives but different patterns of earnings, are being compared with each other. These situations cannot be safely judged on the basis of return on investment. In all except a few highly unusual circumstances, the profitability index method will accurately signal which of them is better. However it should always be remembered that we are talking about only those aspects of the problem that are reduced to measurable terms. Of course, the problem does not arise at all if the two projects are not competing with each other; if the company can do both projects and if it expects to earn 10 percent on the average, it should do both.

Fourth Fallacy: Leasing Is Always Advantageous

Let us now consider some common statements about leasing:

Leasing frees working capital for other uses.

Leasing keeps available an unused line of borrowing power.

Leasing has tax advantages.

Leasing protects you from the risk of obsolescence.

We are in the (particular) business, not the real estate (or data processing, or automobile operating) business.

Leasing is more expensive than debt.

A lease has junior status in reorganizations.

Each of these statements contains a fallacy or, at best, a half truth. Rather than discuss them one at a time, we shall try to put these and other arguments into the proper frame of reference.

First of all, it is absolutely impossible to talk about leasing in general. There are at least three types of lease arrangements, each so different from the other that quite different kinds of thinking are required. There is, first, the agreement that is intended primarily to provide service which, as a practical matter, the lessee cannot obtain in any other way. The person who rents an automobile for a few hours is not faced with a buy-or-rent decision, nor ordinarily is the company which rents office space in a downtown office building. These situations are not investment problems at all; the only question is whether the service provided is worth what it costs.

The second main type of lease is the short-term lease cancelable at the lessee's option on relatively short notice and with relatively small penalty. Office and data processing equipment leases are examples. In these situations the user does have to decide whether he is better off to buy the equipment or to rent it.

In our book, *Office Equipment: Buy or Rent?*[1] we have tried to show how this problem can be analyzed. The example used is office equipment, but the same technique is applicable to all short-term cancelable leases. The procedure is to estimate the costs associated with leasing and the costs associated with purchasing. Since the purchase alternative involves an immediate outlay and the leasing alternative will involve a stream of outlays in the future, the two must be compared by the use of the present value techniques discussed earlier. Each case depends on its own merits and the solution is to figure it out, not to rely on some broad generalization whether put out by someone who is for or by someone who is against leasing.

About the only generalization which safely can be made is that these cancelable leases are essentially devices for shifting the risk of ownership. If you own the equipment, you bear the risk that it will not last as long as you anticipated. If it becomes obsolete sooner or if for some other reason you no longer have a need for it, it is you who suffer the loss. If you let the manufacturer own the equipment and lease it to you, he is the one who takes this risk. Since he knows he bears the risk, he sets his lease rates taking this fact into account. Since all lessees pay the same rate, he must set the rates with regard to the average situation. So the question is whether you are above or below average—average with respect to what money is worth to you, average with respect to the intensity and

[1] R. N. Anthony and S. Schwartz, *Office Equipment : Buy or Rent?*, Management Analysis Center, 1957.

length of time you will use the equipment, average with respect to income and capital gains taxes, and so on. Thus, only calculations geared to your own particular situation can show whether *you* should buy or rent; general rules do not necessarily apply to *your* situation.

The third type of lease is the financial lease, a long-term lease which is either noncancelable or, if cancelable, involves a termination payment equal to the remaining book value of the asset. This lease is strictly a way of raising money. The lease obligation is debt and, although it does not appear on the balance sheet as such, many well-informed lenders will include this obligation as debt when they are appraising the company's borrowing capacity. The problem, therefore, is whether to finance a transaction by borrowing or by leasing. It is a straight financial problem, to be solved by usual financial methods. The actual numerical solution is a little more complicated than in ordinary financial problems because of the different tax treatments of owned and leased assets but, in essence, the problem is the same. The relevant discount rate is low, much lower than in the case of the cancelable lease, because in the financial lease the user bears, in fact, the risk of ownership.

The statement that leasing frees working capital is particularly intriguing and erroneous. Its advocates divide net profit by the working capital to show that the company is earning perhaps 30 percent on its working capital and then dangle before the prospect the possibility of making this return on the working capital freed by leasing. The fact is, of course, that it is not working capital alone that is earning the company's profit; it is all the capital.

Let me make just one comment on the common argument that leasing has tax advantages. Now, throwing money down a "rat hole" has tax advantages; you get a 52¢ tax benefit for every dollar you throw down. In general, the higher your expenses are, the greater the tax deduction but this is not a sound reason for willingly wasting money. The catch is that you do not make a profit by saving the 52 percent; you make a profit only out of the 48 percent. While it is true that the leasing of land has a tax advantage difficult to obtain in any other way, the leasing of depreciable property may or may not have a tax advantage. It all depends on the facts in a particular case, and the tax aspect is only one aspect of the proposition. The solution is not to generalize but, rather, to do some calculating as to where the net advantage lies in each instance.

Fifth Fallacy: Payback Never Gives a Useful Answer

As to the final fallacy, let us go back to the beginning and show how one of the implications that might be read into my initial demonstration is also fal-

lacious, i.e., that any other method than discounted cash flow must be wrong. We should not generalize, for example, that the payback method of computation is obsolete.

As Professor Myron Gordon has demostrated,[2] although the reciprocal of the payback does indeed overstate the true rate of return, the error is not very important under certain conditions. As a rough rule, most companies will find that, if earnings are expected to be level, and if the expected life of the project is somewhat more than twice the payback period, the payback method gives reasonably accurate results.

The table which was offered in Exhibit 2 can also be used backwards to arrive at a good payback rule. If, for example, a company finds that its ordinary production equipment has a life of ten years and if it demands a return of 15 percent after taxes, the figure of 5.019 in the ten-year row and 15 percent columns shows that the company will be safe in accepting projects with a payback of not more than five years, after taxes. The foremen can be told to use a five-year after-tax payback in evaluating such projects without any necessity for educating them in present value concepts. With slightly more effort and assuming a depreciation pattern for tax purposes, one can convert this calculation to a before-tax payback. This figure can be used safely, however, only if earnings are level from year to year and only if the project involves depreciable assets with negligible residual values.

Summing Up

My purpose in exploring these five fallacies has been not criticism, but, rather, to call added attention to certain concepts that are now pretty well established: The only exact way of figuring return on investment is to use present value techniques. The work involved in doing this is only slightly greater than that required by the so-called simple methods. However, the time-adjusted return on investment does not always signal the right decision to the problem, and the newer profitability-index method does. Present value techniques are a rational way of solving buy-or-lease and borrow-or-lease problems, which tend otherwise to get solved on the basis of propaganda and folklore. And, finally, once present value techniques are understood, there are acceptable short cuts, that come out to the correct result for many common problems.

[2] *The Management of Corporate Capital,* Ezra Solomon, Editor, The Free Press, Glencoe, Ill., 1959.

Maintenance of Adequate Tax Records

by MARY LANIGAR*

THE CONTROLLER of a small business which does not have a separate tax department should be particularly alert to tax saving ideas and techniques. A well-arranged and complete file of tax documents is basic. The best method is to open a separate file folder for each type of tax for each year and place together folders for the same tax for successive years. Each folder should contain:

1. File copy of the return.
2. Worksheets which were used to assemble information.
3. Official approval of each extension of time obtained for filing the return.
4. Copy of the letter of transmittal, to evidence the date the return was filed and the address to which it was mailed or delivered.
5. Copies of covering letters relating to installment or other deferred payments.
6. Copies of refund claims, with transmittal letters or receipts.
7. Each agreement to extend the statute of limitations.
8. Any supplemental information submitted to the taxing authorities in writing (including worksheets prepared at their request).
9. A memorandum summarizing any oral discussion with a representative of the taxing authority.
10. Revenue agents' reports, notices of proposed additional assessments, etc.
11. Protests or briefs relating to the tax liability.

The due date for each tax return should be recorded in advance on a special tax calendar to assure that all returns will be filed on time. This scheduling avoids penalties for late filing and permits the work to be planned to avoid excessive overtime.

Files Retention

Several years may have passed before the tax return is examined by the governmental authority responsible. This calls for retention of the related files. In addition, tax files for active corporations and their predecessors in tax free exchanges should be retained permanently. In recent years the Internal Revenue Service and other taxing authorities have scheduled the destruction of the original returns after a stated number of years, but the taxpayer cannot afford to destroy old returns which may be valuable as evidence. For example, the tax cost basis

* Partner, Arthur Young & Company, San Francisco, California.

of an asset may depend upon whether gain was recognized when the property was acquired in an early year. Also, evidence that an election was made or that a method of accounting was adopted is generally found in the first year that the new procedure was used.

Adequate Working Papers and Documentation

Tax returns frequently require information which is obtained by grouping income or expense accounts in a different manner from that shown by the books and financial statements. The accountant or controller who fails to prepare grouping sheets may waste considerable time to satisfy the tax auditor who seizes upon apparent inconsistencies. For example, sales by states, which are to be used for franchise tax allocation factors, often require a compilation not readily reconciled to the general ledger. One or more states use each of the following methods to determine sales:

1. State from which merchandise was shipped from factory or company warehouse.
2. State in which customer received shipment.
3. State in which the order was solicited by a company salesman.
4. State in which the order was accepted.

Under these circumstances, it is important to retain a worksheet showing the rule which was used to attribute the sales to each state, and the source records from which the sales information for each state was obtained. If this is not done, a new employee may fail to understand the diversity in definitions of sales and may inadvertently report sales incorrectly to an important state.

When the method of accounting which the corporation uses for tax purposes differs from that reflected in the books of account, then working papers or auxiliary records are particularly important. A schedule which sets forth the information for each year in columnar form may be needed. For example, schedules of property with a cost for tax purposes different from that shown in the accounts should provide for annual tax depreciation, annual gain or loss from property sold, and a reconciliation of the unrecovered cost at the end of each accounting period. One of the most useful schedules is a cumulative analysis of accumulated earnings for tax purposes. The amount of accumulated earnings and profits is always required to determine whether a portion of a dividend may be a return of capital rather than ordinary income.

An excellent example of the need for retaining information is that of the tax problems which may result from contributions of property to charity. These deductions are difficult to prove at a later date unless evidence is accumulated particularly for that

purpose. Ordinarily the agent who examines the books of the corporation will find a journal entry to record the contribution and to reduce the security account by the cost of the stock contributed. This does not give the market value at the date of the transfer or prove that the charity received the stock. That information is frequently supplied by a letter from the charitable organization on its letterhead referring to the number of shares of a named stock received from the donor, the date of the gift, and the value at that time. Such a letter should be obtained for any gift of property other than cash, and reproductions of it should be placed in the tax file for the year of the contribution. When appropriate, the file should include a letter from a stock broker or the financial page of a newspaper showing stock market quotations for the date in question. Property other than securities should be appraised by a qualified independent person, and his appraisal report should become a part of the file.

It is desirable to institute procedures to make sure that letter copies are in fact placed in the tax file. Most offices now have reproduction equipment which provides a copy of a letter, invoice, or tax bulletin for a cost of only a few cents. If the controller anticipates the problems which may develop when the return is examined, he will find that much confusion may be avoided by placing one or more reproductions of important invoices or letters in the tax file before these documents are sent to the general file. This is particularly true for outside opinions. A letter from an attorney or accountant explaining the procedure to be followed as to a particular transaction is usually filed with other correspondence from that firm. At a later date when the return is audited, the letter may be forgotten unless a copy is also placed in the tax file for the year involved.

There is a particular problem where file space is so limited that documents will be in storage files by the time that a revenue agent examines the tax return. Under these circumstances, a supplementary tax file with reproductions of invoices which will be particularly significant may be advisable. For example, an invoice for a substantial legal fee will be examined by almost all agents, and time will be saved if it is readily available.

When a possible controversy exists as to the tax treatment of an item in the corporate return, the controller should be alert for rulings, cases, articles or other information having a bearing upon the problem. Notations of citations which may be helpful are often placed in the tax file, but considerable time may be required at a later date to locate the material and to find the pertinent portion. A reproduction of the reported court decision or tax article for the tax file is usually more satisfactory. The important sections may be underlined and marginal notes

may be made as a reminder or for emphasis. Occasionally photographs or newspaper articles will be worthwhile additions to the file. For example, it is often difficult to establish a casualty loss several years after the damage has been repaired. Pictures taken immediately after a fire or flood will quickly convince the examining agent that a serious loss resulted. Also, memorandum dictated soon after the event often provides useful details which may not be remembered when the agent arrives several years later.

Know the Rules and Follow Them

If reliance is placed upon professional help, either attorneys or certified public accountants, the controller must see that they are consulted before each transaction which will influence the tax picture takes place. He must also give his counsel accurate and complete information as to all the circumstances, for the omitted fact may be the critical one. The attorney or the C. P. A. will usually prefer to give his opinion in writing, because this provides a record of comments and suggestions and avoids the misunderstandings which may result from oral advice. For the same reasons the controller should be interested in securing a copy of the letter or memorandum for insertion in the appropriate tax file.

When the controller and his assistants have some training in tax matters, at least a part of the tax planning and return preparation may be assigned to corporate employees. However, the necessity for research in a good tax library should not be overlooked. Reliance upon what seems logical or what someone else says that his company has done is dangerous. There is no substitute for a careful reading of the law and the regulations—and for obtaining professional help where necessary.

In keeping up to date, reading one of the weekly tax news letters will provide the controller with a summary of recent developments in legislation administrative rulings, and court decisions. This is helpful but should be backed by further research and consultation on relevant matters. A Federal income tax service should be readily available if corporate employees are expected to prepare income tax returns or plan business transactions to minimize taxes. Sales tax, payroll tax, or state income tax services may be required if the size of the corporation or the scope of its activities is sufficient to require frequent reference to these volumes.

The failure to follow provisions in the regulations concerning the method to be used to make an election occurs frequently. Regulations have been issued for nearly all 1954 Code provisions which specify that each election is to be made by a stated time, and that it is made either by completing and filing a printed form or by reporting income or deductions in a certain man-

ner in the tax return. If provisions of the regulations are not completely followed, the attempted election may be without effect—and the situation not discovered for several years. The opportunity to elect may be permanently forfeited.

The Internal Revenue Service will give advance rulings as to the effect of certain proposed transactions, such as reorganizations. The letter requesting the ruling must give all the facts and must comply in other particulars with published requirements for issuance of advance rulings. When a ruling is obtained, it is important that the completed transactions be in accord with the facts submitted in the ruling request. A corporation may not safely rely upon a letter obtained by another taxpayer.

Filing a tax return showing no liability is good practice when the circumstances indicate that there would be a possible liability if a doubtful question were decided in a different manner. The statute of limitations on assessment of the tax generally does not commence until a return has been filed. For certain excise tax returns, the return should be completed by inserting an amount or "none" opposite each type of tax. (There are rulings that the filing of the return form is not sufficient to start the statute of limitations for those taxes for which no entry is made in the return.)

How the Responsibility Shapes Up

The controller must decide whether he will study taxation regularly or delegate the responsibility for tax planning and return preparation to assistants or to professional persons. In either case, he will be expected to provide accurate information for tax planning and to arrange to carry out each detail as planned, including proper accounting and reporting of transactions in the tax returns. The controller's final responsibility is the retention of adequate records in well-organized files which will provide a full explanation of what occurred if it is required by the taxing authority at a later date.

Income Tax Allocation in Financial Statements—Occasions and Opinions

by SAMUEL L. READY

ANYONE who attempts to define an accounting term in a few simple non-technical words runs the risk of having someone point out that the definition does not cover all aspects. In spite of this risk, I have tried to devise a definition of income tax allocation which would be both broad and simple. I would like to define it as the process of matching in financial reporting the income tax effects of an item of income, cost or expense with the item itself. If there is a need for allocation, it arises principally from the fact that income tax accounting and generally accepted accounting principles are not identical. An item may affect income taxes for a particular year without otherwise affecting net income for that year. The reverse is equally true in that an item may affect net income before income taxes without affecting income taxes as shown by the tax return for the same year.

To begin with, I would like to limit this presentation in three ways. First, we should exclude from discussion all items which have no income tax effect at any time. They do not involve income tax allocation, and our definition would eliminate them from consideration. I refer to such items as nontaxable income from state or municipal bonds and nondeductible expenses such as life insurance premiums where the corporation is a beneficiary. There are many other examples. In the second place, I will limit discussion and illustrations to the matter of Federal income taxes. The third "ground rule" is that the points to be made are applicable only to material items, insofar as any preference may be expressed in this article in favor of income tax allocation. The rule of materiality overrides almost any other accounting rule or principle whenever they come into conflict, and this area is no exception.

Allocation Within or Between Statements of the Period

Income tax allocation has come into play in two general areas. The first, allocation between statements, which takes two principal forms, is of relatively

---

SAMUEL L. READY, C.P.A., is a Partner of Ring, Mahony & Arner, C.P.A.'s, Miami, Florida. He was formerly an Auditor with the Agriculture and Navy Departments of U. S. Government. Until recently a member of the Committee on Accounting Procedure of the American Institute of C.P.A.'s, Mr. Ready has had an extensive experience in public accounting. He is a graduate of the University of South Carolina.

limited importance and has not given rise to any great amount of controversy. I will, therefore, treat it first briefly, so as to get it out of the way and get on to the second area, which is both important and controversial.

Allocation of income taxes within the statement of income, itself, above the item designated as net income for the year is encountered fairly frequently. When an unusual and material nonoperating item enters into the determination of net income, it is often set out separately in the income statement, just before arriving at net income. I have heard no objection to the common practice of showing such items net of their income tax effects, if the amounts of the tax effects are disclosed. When this is done, the item labeled "income taxes," which is deducted before showing the extraordinary item, is greater or less than the actual tax for the year, depending upon whether the extraordinary item is a loss or a gain. I am not overlooking the fact that such items should perhaps, in many cases, be excluded from determination of net income for the year if their inclusion would impair the significance of the net income figure so that misleading inferences might be drawn. However, in the 1959 edition of *Accounting Trends and Techniques* (American Institute of Certified Public Accountants, p. 184), it was reported that out of 78 companies which presented extraordinary items in a separate last section of their 1958 income statements, 48 indicated the inclusion of such items in determination of the figure of net income for the year and only 30 showed the items below the net income figure.

Another occasion for allocation of income taxes within an income statement might result from the separate showing of net income from a particular subsidiary or department which is unrelated to the principal business activity of the reporting company or consolidated group. However, although allocation in such case might appear logical, it does not appear to be a common practice, so far as I have observed, and probably would not serve a useful purpose in most cases, unless the item were of a non-recurring nature.

Also to be considered is *income tax allocation between the statement of income and the statement of retained earnings.* Where an item resulting in a material increase or decrease in income taxes is credited or charged directly to retained earnings, the principle of income tax allocation would require that the income tax effect of the item, whether an increase or a decrease, be likewise entered directly to retained earnings as a partial offset to the item, itself. This practice was prescribed in 1944 by the Committee on Accounting Procedure of the American Institute of Accountants (now American Institute of Certified Public Accountants) in its Bulletin No. 23 (not to be confused with the better

known Auditing Procedures Statement No. 23), which was later included in Chapter 10 (b) of Accounting Research Bulletin No. 43.

As far as I know, no serious objection has been raised to this type of allocation so long as the amount of the tax effect is shown. However, the method of handling the income tax item in the income statement when this situation occurs has given rise to some debate, particularly where the special item is a loss or deduction and its income tax effect is credited to retained earnings. The corollary effect in the income statement is to deduct an income tax provision which exceeds the actual tax for the year or, as an alternative, to show a deduction in the income statement representing a portion of the special item equal to the income tax savings and to charge only the net amount directly to retained earnings. The difference between these alternatives seems to be merely a matter of wording and no significance was attached to it by the Accounting Procedure Committee.

However, in one of its longest accounting series releases, No. 53, dated Nov. 16, 1945, the Securities and Exchange Commission disapproved the practice in such circumstances of labeling the charge in the income statement as "income taxes" or "charges in lieu of income taxes," while approving the second alternative of making the same charge but designating it as a portion of the item written off, equal to the income tax reduction, the remainder of the item being charged directly to retained earnings. While this decision was of general applicability, it seems to have had special significance to utility companies which included income taxes in operating expenses but could not so include some special charges, such as special amortization of bond discount and expenses which had to be included with other interest and debt service charges in the "other deductions" section. In any event, the S.E.C., at that time, made a sweeping statement that, "the amount shown as a provision for income taxes should reflect only actual taxes believed to be payable under the applicable tax laws." This seemed to put it squarely in opposition to income tax allocation as such. Although it has never officially either rescinded or revised that release, the S.E.C. now is a strong advocate of income tax allocation, as we shall see in connection with one of its recent releases.

Allocation Between Accounting Periods

We now come to the real heart of the question of income tax allocation, which involves allocation between accounting periods. This is sometimes called allocation between the income statement and the balance sheet, since the allocation procedure involves setting up a balance sheet item in the form of a de-

ferred charge or a deferred credit or its equivalent. As commonly understood, inter-period allocation of income taxes is involved in the following four types of situations:

1. Cases in which an expense, cost, or loss is deducted in the income statement before it is deductible for income tax purposes.
2. Cases in which an expense, cost or loss is deducted for income tax purposes before it is deducted in the income statement.
3. Cases in which an item of income is included in the income statement before it is included in the income tax return.
4. Cases in which an item of income is included in the income tax return before it is included in the income statement.

Let us consider some items in each of these four categories.

Costs or Losses Taken in Different Periods

Some examples of *costs or losses deducted in the income statement before they are deductible for income tax purposes* are estimated expenses to be incurred on warranties, allowances for cash discounts to be taken by customers, provisions for losses from damage claims against self-insurers, provisions for anticipated losses on abandonments, and provisions for permanent declines in values of investments. Generally accepted accounting principles require that material items of this type be provided for by a charge against income in the year that the probability of the loss or expense becomes reasonably certain, even though the exact amount is unknown and has to be estimated. Yet, in the usual case, these items are not deductible for income tax purposes until they become actual certainties or until legal liabilities are established.

Taking warranties, for example, the principle of matching costs with related revenues requires establishing a provision for the related future expenses at the same time that the gross profit on the sale is taken into income. These future expenses can only be estimated, based on experience. In practice, they are usually ignored if the warranty period is short and the amounts not material, but where they are material and are set up in a liability account, the question of income tax allocation arises. The principle of allocation requires that a portion of the income taxes for the year, equal to the income tax reduction which would have been accomplished if the provision had been deductible, be treated as a prepayment of income taxes or, in other words, a deferred charge to income tax expense.

An alternative which accomplishes practically the same purpose is to set up the estimated liability for warranty expense "net of its income tax effect." In

other words, on the presumption that, when the expense is incurred, it will be tax deductible and will have the effect of reducing income taxes then otherwise payable, it is necessary only to provide for the net amount as a deduction in arriving at net income in the year in which the sale is made. In the case of provisions for permanent declines in the value of investments, the problem is complicated by the fact that, if the investment is a capital asset, it may not be reasonable to expect any future tax benefit from its sale or other disposition by a corporate owner, unless offsetting capital gains are reasonably certain to be available. For this reason, the tax allocation procedure may be inapplicable in many such cases.

The best known *items deducted in the income tax return before they are deducted in the income statement* are deductions for amortization of emergency facilities under Section 168 and for accelerated depreciation under Section 167 of the Internal Revenue Code, when slower methods are used for accounting purposes. Income tax allocation in these instances, as in all others, is based on the principle of matching the income tax benefit, in point of time, with the corresponding deduction in the income statement. The amount of the tax reduction is either set up in a liability account designated as deferred income taxes, or some similar title, or it is deducted from the asset account as additional depreciation, on the theory that the taxpayer has "used up" some of the value of the asset by his depreciation or amortization deduction for tax purposes, thereby decreasing the asset's value as a future tax deduction. Incidentally, some utility companies have treated the balance sheet credit account as restricted surplus rather than as a liability. The S.E.C. has recently announced that this treatment will not be acceptable in statements filed with it.

Income Recognized in Different Periods

One of most common examples of *including an item of income in the income statement before it is includible in the income tax return* is the case of installment sales. In the absence of extraordinary circumstances, it is a common practice to report the gross profit from an installment sale in the year in which the sale is made, due allowance being made for estimated losses and for collection expenses if necessary. However, if the sales can be reported on the installment plan for income tax purposes, it is usually to the taxpayer's advantage to do so. Income tax allocation in this instance would require a provision in the current income statement for the income tax which would have been payable if the gross profits on such sales had been included in taxable income in the same year in which they were included in the statement of income for financial reporting purposes.

Another common example of reporting income in the financial statements before reporting it in the income tax return arises in the construction industry. The completed contracts method of accounting is acceptable for income tax purposes and results in deferring the taxation of profits on any contract until the contract is completed. Yet many contractors realize that this method of reporting may have a distorting effect if it is used in the company's financial statements. It may result in wide fluctuations from year to year in reported net income, depending upon whether the completion dates of large contracts come before or after the end of the fiscal year. The necessary charging off general and administrative expenses in a year in which few contracts were completed may result in reporting a net loss for a year in which the company was in a prosperous condition but happened not to complete several highly profitable contracts until after the close of the year. Use of the percentage-of-completion method of financial reporting on long-term construction contracts is generally acceptable for financial statement purposes, where estimates of progress can be made with reasonable accuracy. Where this is done, and yet the income tax return is made on the completed contracts basis, the principle of income tax allocation requires that the provision for income taxes be computed as though the tax return had also been prepared on the percentage-of-completion basis. This, of course, results in setting up a deferred income tax liability relating to the gross profits which have been included in the income statement but not in the tax return.

The fourth type of case in which the inter-period allocation of income taxes may be appropriate is the case of *income taxed before it is considered as having been earned for accounting purposes.* One of the most common examples of this type is rent collected in advance. This is one of the "pet peeves" of accountants against "judge-made" income tax law. Even when the taxpayer is on the accrual basis, it is insisted that income which is collected in advance of being earned is taxable in the year in which it is collected. In fact, some say this even includes income not collected and not earned but which has "accrued" in the sense of having become due and payable by the debtor. In any event, generally accepted accounting principles do not permit this unearned income to be picked up as income in the financial statements. If income tax, nevertheless, has to be paid on it, such tax, according to the principle of income tax allocation, is a prepaid expense or deferred charge.

More Complex Income Tax Allocation Problems

To this point, only the relatively clear-cut situations involving income tax allocation have been treated here, together with a few examples in the four prin-

cipal situations where the question occurs. These are the situations which merit most attention. However, I want to acknowledge that there are many more complicated situations. Some involve combinations of many of the items already mentioned, which may be partly offsetting in their effects. The existence of losses, including loss carry-overs and loss carry-backs, makes the application of tax allocation more difficult, to say the least. The question frequently arises as to whether income for allocation can or should be applied in situations involving involuntary conversions or tax free exchanges, where assets may be recorded on the books at amounts in excess of or less than their basis for income tax purposes. Such are the complications and "fringe" areas of the income tax allocation question.

Arguments Against Income Tax Allocation

Let us turn now to arguments that have been made for and against interperiod allocation of income taxes, as a generally accepted accounting principle, considering first the negative side of the debate. Limitation of space make it possible to do this only in an indicative way. The quotations which follow have been selected to represent varying viewpoints. They are neither exhaustive in extent nor necessarily authoritative in character.

Among the most prominent opponents can be included the American Accounting Association's Committee on Concepts and Standards Underlying Corporate Financial Statements. In a statement entitled, "Accounting and Reporting Standards for Corporate Financial Statements—1957 Revision," the committee had this to say about income taxes:

> "The law relevant to income taxation should conform as closely as practicable to accounting principles of net income determination. However, tax objectives are inevitably somewhat different from those of accounting, and continuing differences between reported and taxable business earnings are to be expected.
>
> "In any given period, some differences may be attributable to the inclusion or exclusion for tax computation of revenue or expired cost recognized under accounting principles as net income determinants in earlier or later periods. Since such differences are often significant, and since they may give rise to expectations of wholly or partially offsetting differences in later periods, they should be disclosed.
>
> "Disclosure is sometimes accomplished by recording the differences as prepayments (given an expectation of future tax savings) or accruals (given the opposing prospect). However, these items do not present the usual characteristics of assets or liabilities; the possible future offsets are often subject to unusual uncertainties; and treatment on an accrual

basis is in many cases unduly complicated. Consequently, disclosure by accrual may be more confusing than enlightening and is therefore undesirable."

The membership of the American Accounting Association is largely in the field of accounting education and, although the committee's statement does not necessarily represent the opinion of the majority of the association's members or of its executive committee, it is nevertheless a very influential and significant statement. Out of seven members of the committee, only one dissented from this section on income taxes.

Still on the educational side, Dr. William A. Paton, whose reputation as writer and teacher of accounting is well established, has also taken a stand in opposition to income tax allocation in the financial statements and in favor of disclosure by footnote only. The following quotation is taken from his text, written with his son (*Corporation Accounts and Statements,* William A. Paton and William A. Paton Jr., MacMillan, 1955, pp. 324-5):

> "For many corporations nowadays the major part of the tax burden is represented by the levies on earnings. In this area it is generally agreed that the tax charge is an expense of the year in which levied, and no accountant would propose to treat any part of such charge as inventoriable. In recent years, however, support has developed for the view that where the income statement issued by a company is prepared on a basis materially different from the computations employed in the tax return the tax charge shown in the income statement should be a hypothetical amount consistent with the reported earnings—in the light of prevailing rates—rather than the amount of tax liability actually accrued for the period."

After mentioning installment sales and amortization of emergency facilities as examples in point, the text continues as follows:

> "Such recommendations are not entirely lacking in appeal, from the standpoint of meticulous matching of periodic revenues and related charges, but they are not free from serious objections. Particularly questionable is the attempt to modify a current tax charge by a factor based on an estimate of the tax requirements of several future years. No one knows what tax rates on corporate income will be in effect in the future, or to what extent differential taxes will be involved, and estimates extending over a considerable period, under present conditions, are bound to be nothing better than sheer guesses. There also is the fact that if it is proper to include estimated future taxes in current charges in cases such as mentioned above, it would seem to be reasonable to defer a portion of a current tax levy to the future for cases where deductions in the income statement are greater than the deductions cur-

rently claimed in the tax return—a procedure which many accountants would be very loath to endorse. Everything considered it may be concluded that those who propose reporting in the income statement of each year only the amount of the tax as computed in the return for the year, coupled with a footnote pointing out any material differences between the revenues and charges of the income statement and the taxable revenues and allowable deductions of the return, have much the better of the argument."

A position in the regulatory field is offered by the Interstate Commerce Commission, which has taken the same position with respect to the reporting by companies under its jurisdiction of income tax reductions resulting from use in the tax return of five-year amortization of emergency facilities or of accelerated depreciation, while following the required straight-line depreciation at lower rates in the records and in reports to the I.C.C. The commission will not permit showing the tax reduction as a charge in the income statement or as a liability in the balance sheet but requires a footnote disclosure of the net accumulated tax reductions realized since December 31, 1949 from these sources. Similar positions are taken by a number of state utility commissions, although many others take the opposite view.

Turning to the accounting profession, itself, it may be interesting to note that Weldon Powell, who is chairman of the new Accounting Principles Board of the A.I.C.P.A., has expressed himself in favor of income tax allocation in many circumstances but has opposed the application of the procedure in the case of accelerated depreciation, "where the situation is such that the so-called tax deferment is in effect a permanent tax reduction." These quoted words are taken from his dissent (with Mr. Jennings), as a member of the Accounting Procedure Committee of the A.I.C.P.A., from certain provisions of Accounting Research Bulletin No. 44 (revised), issued in July, 1958. The concept that the tax reduction from use of accelerated depreciation may be permanent is arrived at by considering the fact that most growing or static firms will have a continuing flow, year after year, of new investments in fixed assets, and that the benefits of accelerated depreciation on these new assets will always offset, or more than offset, the effect of lower depreciation for tax purposes near the end of the useful lives of the older assets. It is, therefore, argued that the growing firm can look forward to an ever-increasing annual tax saving and that only a dying firm with a declining investment in depreciable assets is likely to be faced with a substantial deferred tax liability—and then only if its last years are profitable ones!

From the professional literature, the case for opponents of income tax allocation was stated in the September 1958 issue of the *Journal of Accountancy* in

an article entitled, "Allocation of Income Taxes" by Mr. Ralph S. Johns, co-author of a well-known auditing text and author of many other contributions to accounting literature. He states in conclusion, "In my opinion, no corporation should be required to provide for income taxes by charges to income of amounts in excess of the legal liability therefor," but he makes exception for appropriate accruals on interim statements.

Arguments for Income Tax Allocation

Now let us consider some of the positions taken in favor of inter-period income tax allocation and reasons given. Accounting Research Bulletin No. 23 issued in December, 1944, and restated as Chapter 10(b) of Bulletin No. 43 has already been mentioned. In that bulletin, the American Institute's Committee on Accounting Procedure made the statement (page 88) that:

> ". . . income taxes are an expense that should be allocated, when necessary and practicable, to income and other accounts, as other expenses are allocated. What the income statement should reflect under this head, as under any other head, is the expense properly allocable to the income included in the income statement for the year."

This seemed to be a stand in favor of income tax allocation, but the qualification "when necessary and practicable," as well as other qualifications in the bulletin, diluted its general applicability. Nevertheless, since the time of its issuance the practice of income tax allocation has gained adherents who have applied it to an increasing variety of situations. On the other hand, when Bulletin No. 44 on declining balance depreciation was issued in October 1954, the committee made the following statement:

> "There may be situations in which the declining-balance method is adopted for tax purposes but other appropriate methods are followed for accounting purposes. In such cases it may be that accounting recognition should be given to deferred income taxes. However, the Committee is of the opinion that, in the ordinary situation, deferred income taxes need not be recognized in the accounts unless it is reasonably certain that the reduction in taxes during the earlier years of use of the declining-balance method for tax purposes is merely a deferment of income taxes until a relatively few years later, and then only if the amounts are clearly material."

In July, 1958, the committee revised Bulletin No. 44 and, in effect, opposed income tax allocation in practically all such cases, regardless of the period of deferment. The only specific exception noted was in the case of such public utility companies as are not allowed by regulatory authorities to include deferred

income taxes in their expenses for rate-making purposes. There were dissents in part from the revised bulletin, including Mr. Powell's, previously mentioned.

There have been several other bulletins in which the Accounting Procedure Committee, before its life was ended in August, 1959, expressed approval of the income tax allocation principle in specific circumstances. It justified its stand in Bulletin No. 44 (revised) by the simple statement that "recognition of deferred income taxes . . . is necessary to obtain an equitable matching of costs and revenues and to avoid income distortion." This seems to have been a fair statement of the feeling of a large majority of its members.

We have seen that the Interstate Commerce Commission prohibits income tax allocation in the area of accelerated depreciation and amortization. The Federal Power Commission permits but does not require it, recognizing the conflicting decisions of various state commissions which have jurisdiction over utility companies. As already noted, the Securities and Exchange Commission has come out with a ruling requiring income tax allocation in depreciation and amortization cases. This ruling is effective April 30, 1960. It also contains a prohibition against classifying the credit account for deferred income taxes as any form of equity capital. This was directed toward those utility companies which strongly advocated tax allocation or "normalization", as they called it, but insisted that the deferred taxes are neither a liability nor a reserve against an asset. They argued that the intent of Congress in allowing liberalized depreciation was to encourage investment in plant and equipment and that, in the case of the utility companies, this purpose would be defeated if the deferred taxes were allowed to reduce the company's rate base or adversely affect its ratio of debt to equity capital. There seems to be no doubt that the S.E.C.'s decision will create financing problems and may create rate problems for these companies. It is believed, however, that many accountants will share the difficulty which the S.E.C. and the Accounting Procedure Committee had in reconciling a charge to income with a simultaneous credit to surplus, even though designated as restricted.

The article cited earlier, written by Ralph S. Johns and published in the *Journal of Accountancy*, stating the case against income tax allocation, was answered in the January, 1959 issue of the same periodical by Professor Willard J. Graham of the University of North Carolina under the same title. He contends that even so-called "permanent" tax deferrals require recognition in the accounts and points out that, with respect to specific items of property, there is no permanent deferral. He argues that particular segments of the liability do mature and that it is only offsetting additions to the liability which avoid a net decrease in the total liability.

Possible Extensions of the Principle

Since the advocates of allocation have largely been concerned with avoiding distortion of income statements, they have been relatively indifferent to questions which have no effect on current income. Thus, little attention has been given to problems which primarily involve differences between the tax basis of assets and their book values. There is some evidence, however, that the same principles will be applied in that area. For example, in a recent prospectus involving a real estate company, the property which had been transferred to the corporation by its principal stockholders in a tax-free transfer was set up on the corporation's balance sheet at the transferor's cost, plus his carrying charges for property taxes and interest which he had taken as a tax deduction during his holding period, less the income tax effect at corporate rates of exclusion of these carrying charges from the corporation's tax basis in the event of subsequent sale of the property. This procedure has many possible applications, especially where a corporate acquisition is treated as a purchase for accounting purposes, rather than a pooling of interests, and yet qualifies as a tax-free reorganization for income tax purposes. In such cases, the property may be valued for financial statement purposes at an amount substantially more or less than its tax basis. The tax differential will, no doubt, have been given due consideration in the negotiations leading to the acquisition. If so, it appears that it should be recognized in the accounts and financial statements, either as a deferred asset or liability or as an adjustment to the valuation of the property involved.

Necessary for Fair Presentation

Although income tax allocation is still a live issue, as evidenced by its assignment as a subject for research by the American Institute of Certified Public Accountants, it seems to me that the action of the S.E.C., together with the general acceptance of the practice by corporations and public accounting firms, largely reduces the area in which dispute is much more than a mental exercise. If this is true, the main questions for the future will be how far the principle of income tax allocation will be extended, rather than whether or not it will be applied at all.

Inter-period income tax allocation is here to stay, although it may not be applied consistently or universally for many years to come, if ever. While I recognize the validity of arguments against it, I feel that, when the chips are down, the arguments in its favor will control the decisions of those of us who are called on to express opinions as to the fairness of financial statements, wherever failure to follow the principles of income tax allocation will materially affect the stated results of a company's operations.

Responsibility Reporting to Management

by JAMES A. DeVILLE

THE FORT WAYNE DIVISION of The Weatherhead Company, which consists of four manufacturing plants and two major warehouses, is recognized as the world's largest original equipment manufacturer of automotive brass and steel tube fittings, drain and shut-off cocks, fuel and oil lines, brake hose, power steering hose assemblies, and dash controls. In addition, it furnishes aviation and industrial tube fittings, other types of fittings, hose, hose ends, and hose assemblies to a sizable market. The division supports a large nation-wide selling and merchandising organization in both the original equipment and replacement markets.

Management needs basic data to formulate decisions which will maintain and, preferably, increase the earnings of the business. Such data must be presented in a manner which provides the proper perspective for profit-making decisions. It follows that our objectives as accountants should be to do our accounting and reporting for profit's sake. Recognizing this need, we set out to decentralize certain accounting functions and redesign our reports to reflect responsibility for profits.

Decentralization—and Our Approach to Responsibility Reporting

On March 1, 1955, accounting for the Fort Wayne Division was decentralized to the extent that each plant and warehouse was delegated the full responsibility for general accounting, cost and budgeting, property accounting, and payroll calculations and distributions.

In addition to directing the accounting policies and procedures, the division office functions embrace the centralized vouchering of payables, maintenance of receivables, conduct of credit and collection, and the utilization of the division's tabulating facilities for customer billing, payroll check-writing and statistical analyses.

Each month-end all locations are required to submit a complete set of standard

---

JAMES A. DeVILLE, Paterson Chapter (Fort Wayne, 1955), is Manager of Accounting and Budgets, I.T.T. Communication Systems, Inc., Paramus, New Jersey. Previously, he was affiliated with the Weatherhead Company, International Harvester Company, and DeVille & DeVille Public Accountants. Mr. DeVille has a B.S. degree in Accounting from Indiana University. A previous contributor to the *Bulletin*, he received a Certificate of Merit for this paper in 1958-59.

plant operating statements, including a product-line profit and loss statement, as follows:

PLANT AND WAREHOUSE OPERATING STATEMENTS

*1. Profit and loss statement
2. Trial balance of assets and liabilities
3. Reconciliation of intercompany control
4. Reconciliation of interdivision control
*5. Analysis of sales and standard cost of sales by product line
6. Inventories
7. Details of inventories
8. Analysis of material price variance
9. Analysis of material usage variance by product line
10. Analysis of actual and standard direct labor costs by product line
11. Analysis of standard direct labor costs and variance by department
*12. Manufacturing expenses (departmental budgets at plant support this statement)
*13. Miscellaneous variances
*14. General expenses
*15. Engineering expenses
*16. Administrative expenses
*17. Customer service expenses
18. Fixed assets and fixed asset reserves
19. Details of fixed asset additions
20. Details of fixed asset disposals
21. Details of fixed asset transfers
*22. Details of open appropriations
23. Cost of goods made and sold
24. Product line profit and loss statement
*25. Salesmen's territorial operating report
26. Daily divisional report of shipments and orders received

*Monthly budgets required

The establishment of the budgets noted in the above list, throughout the entire division, was our first step towards profit responsibility accounting. Just how useful a tool budgets would be toward fulfilling our needs for profit control would depend a great deal on how results were reported to management. The system which was developed and is described in this article constitutes a balanced and stimulating reporting system to advise management of profit results quickly and accurately.

Responsibility Reporting and Its Roots in Responsibility Budgeting

Complete books have been written about "eye appeal" techniques to help executives read lengthy accounting reports faster and with much greater comprehension. This is important to consider in all reporting. However, little has been said about developing the theme of responsibility accounting as the basis or framework for the entire management report. I shall try to emphasize the simplicity of this theme, its stimulating effect, and the techniques we use to make it pay off in our reporting for profit's sake.

Few accountants fully understand the meaning of the word, responsibility, when applied to responsibility accounting. The definition of responsibility is, "the state or quality of being responsible; accountability; moral accountability." Responsibility accounting is accounting designed to determine the responsibility for both favorable and adverse deviations from normal or targeted operating results of a business. Responsibility reporting names *people, places* and *things* responsible.

Many accounting systems are so poorly constructed that responsibility accounting would be impossible. As to the accounting systems in which responsibility accounting would work and is not in use, the accountant is either unaware of its potentialities or, because responsibility accounting points a finger at top management inefficiencies as well as efficiencies, the accountant is too diffident to call a spade a spade in presenting the hard and true facts concerning profit responsibility. This type of accountant would rather bury management in reports of every nature, and hope that management personel will draw the right conclusions. Many accountants just do not trust their systems to yield responsibility data which can be backed up with facts and figures.

It must first be pointed out that the backbone of any system of reporting which effectively pin-points responsibility for profits is a properly designed accounting system in which profit-making potentials are accurately measured in all areas of the business and become the yardstick for establishing good budgets based on realistic sales forecasts. Without first considering this point, the accountant lacks the tool by which to measure performance and would fail in attempting to pin responsibility. On the other hand, having properly considered this factor, he has the raw material by which to develop the responsibility theme in his monthly reporting. The problem then becomes one of how to make a simple and concise monthly review designed to systematically account for differences from targets and emphasize them in accordance with their relative importance and in a way that will stimulate action.

Our entire reporting system starts with the establishment of yearly sales

budgets, cost budgets, setting of inventory standards, etc. Sales for the year are planned by territory by line. When the sales picture has been summarized and approved by management, it is spread to the plant and warehouse level by month by line. Each location develops a complete profit and loss budget for each month of the coming year based on these sales figures. The cost of sales figures in these budgets are developed from the line break-down of budget sales. Other expenses of the plants contained in the budgets, such as manufacturing expenses, general and administrative expenses, etc., are supported by detailed budgets based on the sales volumes forecast. All plant and warehouse profit and loss budgets and supporting budgets are consolidated at division level. There the division office budgets for each department are added to complete the yearly budget picture. Because budgets are not flexible enough to measure monthly activity, quarterly sales forecasts, submitted prior to each quarter, are used as the basis for measuring monthly results.

Management at all levels, having agreed upon targets of activity, is anxious to check progress day by day. This is done by means of our daily divisional report of shipments and orders received which shows shipments and orders received by location and sales division, and compares shipments to date with forecast. Where practical, day-by-day figures compared to budget are measured farther down in the overall budget. An example of this would be daily foremen's reports at the plant level which list, for example, workers failing to "make out" on incentive pay, downtime, re-work, scrap, percent of incentive coverage, etc. The foremen must be advised currently; a monthly report is of little value to correct day-to-day inefficiencies.

How the Profit Responsibility Summary Gained Stature

On the first working day following month-end, division management receives a "flash" statement of the profit or loss, which stimulates interest in month-end results. This report is estimated by using as much actual data on operations as is available, and projecting the rest. On the fourth working day, without benefit of early cut-offs, we have final consolidated divisional trial balances, profit and loss statements, and balance sheets. At this point, management receives its first report of results and the accountant's job of analyzing month-end figures begins.

By the fifth working day (later delayed by a day to serve its purpose more fully), profit responsibility for profit differences is determined. At first, we waited until the entire month's operations could be explained in detail before reporting results to management. This report was presented in a review on about the fifteenth working day. The task of getting it completed was com-

EXHIBIT 1

Fort Wayne Division
Profit Responsibility Summary

Year to date Loss (gain)	Responsibility	Monthly Total	Plants A	Plants B	Plants C	Plants D	Whse. A	Whse. B	Div. office
	Sales dept.								
73,640	Volume	25,787	9,223	7,555	35,520	3,531	(32,542)	2,500	
37,541	Mix	9,521	(9,398)	16,554	7,787	8,011	(11,385)	(2,048)	
	Cust. service								
850	O. E. M.	(3,964)							(3,964)
(5,497)	Dist.	(1,860)							(1,860)
106,534	Total sales dept. responsibility	29,484	(175)	24,109	43,307	11,542	(43,927)	452	(5,824)
	Plants & warehouses								
(24,577)	Burden variance	(25,943)	(6,560)	(4,563)	(7,377)	(7,443)			
252	Labor variance	5,780	670	(2,118)	1,211	6,017			
945	Pur. disc. variance	(975)	170	(243)	302	(1,204)			
(234)	General expense	315	185	(9)	43	96			
9,689	Administrative expense	3,281	2,225	103	421	457	45		
(3,255)	Customer serv. -whses.	(6,586)					(5,354)	(1,232)	
(17,180)	Total plant & whse. responsibility	(24,128)	(3,280)	(6,830)	(5,400)	(2,077)	(5,309)	(1,232)	
(6,447)	Division office	(6,207)							(6,207)
82,907	Total controllable	(851)	(3,455)	17,279	37,907	9,465	(49,236)	(780)	(12,031)
65,581	Total noncontrollable	34,160	28,066	10,523	6,537	(11,857)	704	187	
148,488	Total loss accounted for	33,309	24,611	27,802	44,444	(2,392)	(48,532)	(593)	(12,031)

plicated by the fact that, at management's request, we had to give oral answers to questions which would later be covered in the review. By the time the review was held, interest had passed on to the current month's operations. Since profit responsibility was summarized on the fifth working day, as noted above, we decided to expand this summary by adding sufficient commentary to answer most questions.

As a result, the Profit Responsibility Summary, Exhibit 1, turned out to be our most valuable report. Not only did it help to answer the most important questions asked by management, but it also saved us time in preparing our formal monthly review of operations, which is currently being presented to management on the tenth working day. Management is also now more receptive to the formal monthly reviews. The profit responsibility summary of factors affecting profits by responsibility and location consists entirely of figures representing *differences* between actual and budgeted profits, by responsibility, at all levels of our operations. With this report as the key to the strong or weak spots in our month's operations, we set out to get explanations for the whys and hows in more detail. This means of summarizing differences in performance also gives the reader the perspective necessary to deal with differences in the order of their importance.

In most cases, there is sufficient month-end detail available at the division office at this time of the month to answer questions arising from the profit responsibility summary. In the event that information is desired from a plant to complete the picture, we can request enough specific information from the plant accountant to satisfy the requirements. The ability to account for profit differences can be taken, if need be, to the point of analyzing a month's setup, re-work, or downtime at a plant or of listing salesmen whose expenditures exceeded a particular amount for the month. The flexibility in pin-pointing selected profit exceptions stems from the thoroughness of the job done in establishing budget and our insistence that all accounting records be kept as current as possible during the month so as to facilitate early closings.

Sales Department Responsibility

As the profit responsibility summary shows, the sales department's responsibility includes sales volume, mix variances, and selling department expenses, which include customer service department, salesmen and sales office expenses. Sales volume and mix variances are determined by location. In order to illustrate the method we use to determine and allocate these variances, assume that the following figures represent Plant A:

	Net sales	*Standard cost of sales*		*Gross profit*	
		$	%	$	%
Budgeted	$595,000	416,500	70.0	178,500	30.0
Actual	585,000	380,250	65.0	204,750	35.0
Difference	$(10,000)	(36,250)	(5.0)	26,250	5.0

Sales volume variance is determined by multiplying the difference between actual and budgeting net sales by the gross profit margin as follows:

Net sales difference	$(10,000)
Budgeted gross profit	30.0%
Unfavorable volume variance	$ (3,000)

Sales mix variance is determined by multiplying actual sales by the budgeted gross profit percentage and then subtracting the result from the actual gross profit figure as follows:

Actual sales	$585,000
Budgeted gross profit	30.0%
Result	$175,500
Less—Actual profit	204,750
Favorable mix variance	$ 29,250
Unfavorable volume variance	(3,000)
Gross profit difference	$ 26,250

Inasmuch as both actual and budgeted customer sales and cost of sales are available by line, our commentary on these variances will explain in which lines sales figures missed targets. The sales department must answer why.

Plants and Warehouse Responsibility

Each plant and warehouse is headed by a manager. It is the purpose of the related section of the summary to assess responsibility for profit results to a particular location and its manager and, just briefly, to indicate what areas of his organization contributed to the picture. At the plant level, profit responsibility summaries are, of course, more detailed and pointed. The items considered at the plants and warehouses are as follows:

1. Burden variance results from differences between the actual and budgeted results of flexible monthly departmental manufacturing budgets. As mentioned previously, these budgets are based on levels of production actually attained. Manufacturing budgets are the

basis for our foremen's incentive plan. They reflect the maximum possible savings as targets; average or good performances in this area still show adverse variances. The approach to setting targets for all areas of our expense is to set maximum attainable results. Since manufacturing expenses budgets are flexible, the monthly profit and loss budget figure for burden variance and, consequently, profit must be adjusted before determining profit differences to be accounted for in the summary.

2. Labor variance is pretty much self-explanatory. Among the operating statements from each plant monthly, we receive a breakdown of direct labor results by line and by department which displays the labor variance analyzed to hour and rate categories. This report enables us to classify exceptions quickly which, again, we explained in the commentary accompanying the profit responsibility summary.
3. Purchase discount variance is the responsibility of the purchasing and, possibly, the accounts payable departments, depending upon results of our analysis.
4. General and administrative expenses result from departmental budgets at each location and are, first, the responsibility of the department head and then, in total, the responsibility of the plant manager.
5. Customer service—warehouse relates to warehouse operating expenses. These are considered customer service expense and the responsibility of the warehouse manager.

Division Office Responsibility; Noncontrollable Differences

The results of departmental division office budgets for general, engineering and administrative expenses are, initially, the responsibility of each department head. For instance, there are five departments within the divisional accounting organization; each department head has his own budget and is the person primarily responsible for budget differences. The controller is responsible for all accounting costs. The division vice-president is responsible for overall divisional results. In other words, responsibility has pyramided until the entire responsibility for all division profit results rests with the divisional vice-president.

All controllable profit differences having been accounted for, all that remains is noncontrollable differences. An example of such a difference is material price variance which, none the less, is measured as a result of setting yearly standards and has to be explained. As a specific instance, the effects of a one-cent decrease in the price of brass per pound can be accounted for in this

manner quite easily. The summary merely gives management the perspective to decide what remedial measure need be taken to recover this loss, either through price change or other means.

Materials Supplied for Formal Monthly Review

By furnishing management with the profit responsibility summary on the sixth working day—only one day delayed from the fifth, previously cited, to permit of adding comments—and using it to help us select the type of reporting still needed for our formal review, we are able, as already noted, to bring the latter forward to the tenth working day from the fifteenth, with a significant advance in terms of interest inspired. Our formal review, in addition to highlighting in more detail exceptions pointed out in the responsibility summary, contains a few stand-by reports not developed entirely to account for lost profits, but these reports are designed, where practical, with the use of the responsibility theme. Reports Nos. 9 and 17 out of the succeeding list are examples and are offered here as Exhibits 2 and 3. Given below are the titles of stand-by reports and graphs used in the monthly review.

SUMMARIES PRESENTED IN THE FORMAL REVIEW

1. Material price variance by material type by location.
2. Orders received compared to shipments by sales division.
3. Orders received by location (previous month compared to present month).
4. Shipments by location (actual, scheduled and budgeted).
5. Inventories, beginning and ending, to show increases or decreases.
6. Inventory changes by material, type, etc., summarized by location.
7. Average base and earned labor rates by locations, analyzed to show cause of increases or decreases.
8. Summary of open capital expenditure appropriations by location.
9. Summary analysis of direct labor and manufacturing expenses (Exhibit 2).
10. Overtime dollar analysis by location, past month versus current month (change explained).
11. Personnel changes explained.
12. Accounts receivable aging analyzed.
13. Differences in division office budgets analyzed and explained.
14. Analysis of selling expenses by elements, actual versus budgets.
15. Return on investment summarized by location.

Summary Analysis of Direct Labor and Manufacturing Expenses

	Plants A	B	C	D	Total	Better or worse Previous Month
Direct labor						
Actual direct labor	47,387	37,020	38,828	33,390	156,605	+ 18,947
Standard direct labor	44,079	28,690	34,889	29.657	137,315	+ 16,754
Labor variance: Rate	3,153	3,066	2,132	2,056	10,407	+ 1,875
Hour	155	5,264	1,807	1,677	8,903	+ 318
Total labor variance	3,308	8,330	3,939	3,733	19,310	+ 2,193
% to standard	7.5 %	29.0 %	11.3 %	12.6 %	14.1 %	- 0.1 %
% of capacity operated	72.1 %	44.2 %	93.9 %	68.4 %	66.4 %	+ 8.5 %
% of incentive coverage	92.5 %	81.1 %	77.1 %	77.4 %	78.1 %	- 3.1 %
% of labor efficiency	138.3 %	135.8 %	138.3 %	129.2 %	135.6 %	- 1.5 %
Direct labor cost per earned hour produced	$1.62	1.74	1.71	1.72	1.69	---
Deficiency amount	136	581	413	1,086	2,216	+ 306
% to direct labor	0.3 %	1.6 %	1.1 %	3.3 %	1.4 %	---
Manufacturing expense						
Mfg. expense-actual	121,119	114,171	143,091	175,021	553,402	+ 46,628
Potential savings	14,958	12,114	25,791	---	52,863	+ 6,766
% to total mfg. exp.	12.3 %	10.6 %	18.0 %	---	9.6 %	+ .5 %
Actual savings	10,798	9,766	19,214	---	39,778	+ 5,681
% potential realized	72.2 %	80.6 %	74.5 %	---	75.2 %	+ 1.3 %
Bonus earned-total	1,046	1,180	525	---	2,751	- 141
Bonus earned - Average per man	80	74	66	---	74	- 4
Ratio of savings to bonus	10 to 1	8 to 1	37 to 1	---	14 to 1	+ 2 to 1
Burden cost per earned machine hour produced	3.24	4.41	5.63	8.72	5.08	- .41

Comment

Production was up at all locations and burden cost responded nicely by dropping 41¢ per earned machine hour. Labor control was loosened slightly as evidenced by the decrease in percent of incentive coverage and in percent of efficiency of incentive direct labor. Other labor factors, such as rate and hour variances and deficiency payment, increased proportionately with increased direct labor.

Foremen's incentive budget savings registered an all-time high for the month, of $39,778. Bonus payments amounted to $2,751, this cost being less than in previous months.

16. Analysis of profits by sales division, plants and warehouses, based on product-line profit and loss statements.
17. Excess fixed factory cost analyzed and prorated (Exhibit 3).

GRAPHS USED IN THE FORMAL REVIEW

1. Break-even charts, by plant, based on total net customer and inter-division sales.
*2. Net sales by sales division.
*3. Selling expense dollars by sales division.
*4. Percent of normal capacity operated, by location.
*5. Average actual direct labor cost per earned machine hour, by location.
*6. Percent of efficiency of incentive direct labor, by location.
*7. Burden cost per earned machine hour, by location.
*8. Consolidated shipments and inventories.
*9. Sales and profit growth chart.
10. Pie chart of profit and loss distribution of net sales for the month.
11. Pie chart of distribution of sales by type and shipping point.
12. Pie chart of distribution of net profit by plants and warehouses.
13. Monthly bar graph of customer sales and profit by line.

*Indicates 5-year graphs.

Excess Fixed Factory Cost Analyzed and Pro-Rated

	% of capacity operated		Fixed costs over or (under) absorbed	
	Month	Year to date	Month	Year to date
Plant A	77.0	96.5	$ (7,498)	$ (4,209)
Plant B	60.8	67.8	(12,779)	(41,671)
Plant C	86.3	110.8	(5,806)	19,136
Plant D	78.1	75.2	(14,235)	(64,610)
Total original equipment Sales div.	73.7	85.5	$ (40,318)	$ (91,354)
Warehouse A	-0-	-0-	11,761	26,072
Warehouse B	-0-	-0-	2,125	4,711
Total distributor Sales division			13,886	30,783
Grand Total			$ (26,432)	$ (60,571)

EXHIBIT 3

Although responsibility for fixed expenses is not incorporated in our responsibility account chart and summary, we feel that this item is important enough to be detailed in such a manner as to emphasize the effect on profits of not having sufficient sales volume to utilize plant capacities. Exhibit 3 is the relevant report. Warehouse responsibility for fixed expenses arises from plant fixed expenses which are distributed between warehouse and plant shipments on the basis of cost of goods shipped. With realistic, normal-capacity figures on practical machine utilization as the basis for determining excess factory fixed cost, the accountant can defend his position to the point of listing the excess equipment which accounts for the loss in profits and can also tell the sales staff what product sales are needed to achieve maximum profit through full machine utilization. Reporting of this nature nicely supports any selective selling program as well as a machine utilization program.

Advances in Coverage and Use of Responsibility Reporting

From the time we first adopted the responsibility theme in our reporting, we have been stimulated to a more exact and flexible type of accounting system. We have found, for instance, that areas of cost which had eluded measurement for years have yielded and been controlled. Moreover, for every area that is controlled, a need to control other areas arises and is dealt with.

Responsibility reporting has also helped to speed up and simplify our entire reporting system and, what is more, management has not been in the least hesitant to accept and use this reporting to follow trends and find areas for improvement in operations.

Inventory Management — An Application of the Exception Principle

by DOYLE W. SELDEN

INTEREST IN THE NEED for better inventory management stems from the growing awareness that inventory is an expensive asset to maintain. The large sums of money committed to it are constantly in danger of depreciation through deterioration or obsolescence. An overly penurious inventory policy can increase production costs, delay deliveries and reduce service to the customer.

How to steer a proper course between too much inventory and too little is easier to say than to do. In this paper, the experience of the aeronautical supply system of the U. S. Navy in developing a new technique for handling its maintenance inventory will be outlined. It is believed that a description of the practices which this organization has recently developed will be of value to many other organizations with large or decentralized inventories.

Trend to Mechanized Determinations

The traditional methods of controlling inventories include setting maximum and minimum levels, establishing turnover ratios, and limiting inventories to a given number of days supply. There has been a recent trend toward relating inventory levels to future requirements and other means of establishing more accurate stock levels and economic purchasing quantities. This approach, in turn, has brought into use the mathematical inventory formula and the central office computer. In many cases, the home office computer is connected by a rapid data transmission network to the various branch plants and warehouse stocks. This kind of facility has made it possible for the home office to have an automatic perpetual inventory of all the company's assets. Inventory management is often then viewed as merely an automatic mathematical operation, manipulated by the computer at the home office.

Note: The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the U. S. Navy Department or the naval service at large.

COMMANDER DOYLE W. SELDEN, San Diego Chapter (Southern Maine, 1956), Supply Corps, U. S. Navy, is at the Naval Air Station, Barber's Point, Hawaii. At the time of this article, he was on the staff, Commander, Naval Air Forces, Pacific Fleet, San Diego. He is a graduate of the University of Michigan, with an A.B. degree in Economics and a Master's degree in Business Administration.

Is this the final solution to inventory management? The aviation supply organization of the Navy has in many ways pioneered in the use of electronic data processing and automatic data transmission in its inventory control. Our experience with this system reveals that, while it solves many problems, it has several important disadvantages.

First, it is expensive. Second, it encourages an excessive reliance upon automatic processing. There is often a tendency to forget that the computer is responding to formulas which are just guides. The essential truth may thus be forgotten that the computer and its formula may reveal that something is wrong, but its formula will not reveal the cause of the malfunction. This cause must be located individually, by human analysis. Third, the computer and its formula have not up to now been readily adaptable to unusual situations. For instance, when an item becomes scarce, its issue through normal supply operations should be stopped and it should be rationed to the projects most essential to the entire organization. This decision cannot be made by the computer and its formulas. This is a most important point in inventory management which has not been emphasized.

For these reasons, and others outlined later, we were not completely satisfied that the trend to automation would solve all our inventory problems. In mid 1958, we decided to experiment on the West Coast with some of the techniques of management by exception in the field of inventory control.

Our System—and Our Problem

To provide supply support for the air arm of the fleet, the aviation supply system of the Navy must maintain about 480,000 active items of supply and process about 500,000 demand documents per month. The home office of this system is the Aviation Supply Office located at Philadelphia. This office procures and distributes and is inventory manager for all aeronautical items. The stock is not warehoused at the Aviation Supply Office, but is located at a total of 100 activities in the continental United States, overseas, and on ships.

To process its inventory records, the Aviation Supply Office is equipped with two I. B. M. 705 computers and complete magnetic tape facilities. Eighteen major stocking points in the United States are connected with the home office by an I. B. M. 3-line, 4-channel card transceiver communication network. This network has a limited capacity which can transmit only a fraction of the total daily transactions. The frequency of stock status reporting on this network varies with the value classification of the item: (1) high-value repairable components (about 0.6 percent of the total stock) are reported daily; (2) medium-value repairable components (about 5.7 percent of the items) are reported

monthly; (3) all other items which have been active during the quarter, are reported quarterly.[1]

Items of general application move throughout the system by requisition, with the inventory manager computing the total system needs by formula and demand experience. Items with specific overhaul or maintenance application are regularly assigned or "pushed" as we call it, to the major continental supply activities. By push, we mean that the material is assigned automatically on the basis of a computation of scheduled local operations multiplied by standard usage factors for the item. Two of the major continental depots, one on each coast, in turn push material onto ships and to overseas stations. Smaller activities located near the major activities requisition material from them as needed. This system had provided adequate support in the past, because the older aircraft were sufficiently stable to enable us to make satisfactory usage predictions.

Three years ago, a crisis began to confront aviation supply. With the introduction of a number of new swept-wing jet aircraft into operation (concurrent with severe fund limitations for parts), it became very difficult to maintain naval aircraft at a high level of availability. At the lowest ebb, one-fourth of the new aircraft was down, unavailable for flight, awaiting parts. This was an untenable situation, economically and militarily.

One possible solution, following traditional thinking, would have been to buy more material, hire more personnel in order to manage items better, and secure a daily transaction report for every item from all the authorized stocking activities. Several difficulties with this course of action were obvious: (1) the funds for more material and personnel were not available, (2) the computers and additional communications facilities required to operate a daily reporting system would have been much too expensive, (3) it would have taken a minimum of two years to plan, obtain, and install the additional computers required.

It seemed apparent that an entirely different solution was needed, At the supply headquarters for Naval aircraft on the West Coast and the Pacific Ocean area, we felt that there was another way. We reasoned that it might be possible to develop a procedure which would tell us, every evening, the inventory items which gave us trouble that day. We could then scan Navy West Coast assets and perhaps locate and ship many of the items needed. With such a system, it was believed our problem might be attacked in small daily chunks and that we would have to concentrate daily on just a few hundred items, rather than almost half a million.

---

[1] This has been described by Gosewisch, F. C., in "Controlling Inventories by Value and Other Classifications," *N.A.A. Bulletin*, August 1957.

Fewer Exceptions and Faster Supply Through a Screening Program

We made a feasibility study on the West Coast during July to October 1958. The test result was encouraging. Within a very short time we had 60 more aircraft available daily. At the prices of aircraft today, this is quite a gain. In December 1958, this procedure was installed Navy-wide. As a result of it, the percentage of total aircraft available for operations improved from the lowest point in Navy history to the highest ever achieved. This occurred at a time when the stock level had to be further reduced due to more stringent budget limitations.

The procedure developed has been named the S. A. M. (screening for aeronautical material) program. There are essentially now two phases to this program. One is the organized method of reporting, locating and expediting critical material. The other is the analysis it has enabled us to give to the items which have caused the greatest supply difficulties throughout the organization. The knowledge we have gained from this analysis has helped us to correct the basic trouble on many items and to prevent their recurrence. In other words, the S. A. M. procedure has helped us: (1) put out inventory "fires" and (2) prevent future "fires". Here in more detail is how it works.

Screening by stocking activities—Every day the requisitions from squadrons and maintenance departments on air stations and ships are sent to the local supply department. If the needed part is not available in local supply, the requisition is sent by this local unit to its support station. Eighteen of the major support stations are connected with the Aviation Supply Office by the communication network. It is with these eighteen stations that we are concerned in this paper. At these support stations, the requisitions are filled from on-hand stock, if available. On the average, the local activities and support stations receive about 3,000 emergency requisitions daily and fill about 95 percent of them immediately.[2] The five percent (or 150 requisitions) which cannot be filled by the support station are then screened by the S. A. M. program. That evening they are transmitted via the communication network to the Aviation Supply Office in Philadelphia.

Screening by the Aviation Supply Office—Later that evening the office sorts the cards received from all of the 18 activities into stock number sequence, collates and matches them against the items on which it receives daily asset

[2] An emergency requisition means that a plane is grounded awaiting repair parts. For military and economic reasons, it is most important that a maintenance item which will ground an expensive aircraft be found and supplied as quickly as possible.

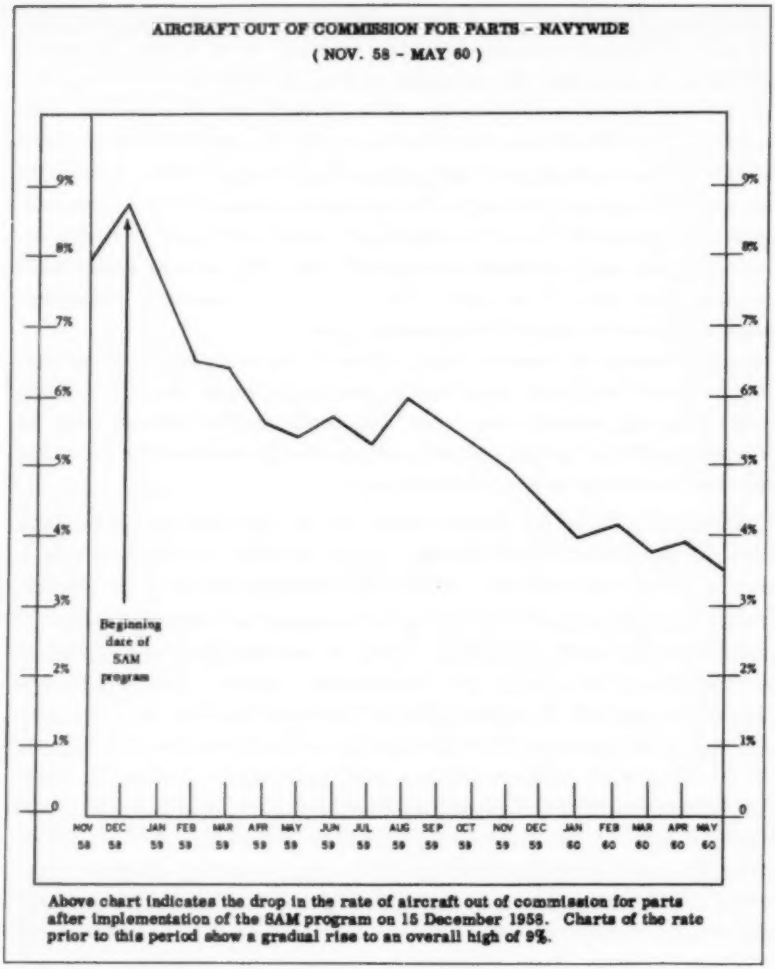
knowledge. About 11 percent of the requisitions are for high-value items. The full deck of unfilled requisitions for the unmatched items is then transmitted back to the 18 activities. By the second working hour of the following morning, these activities have performed a manual-visual search of their local stock record cards for all the items listed in this deck. The applicable assets found in their stock are then reported back to the Aviation Supply Office. This searching operation requires about two to four manhours at every activity. About 80 percent of the total of these 150 requisitions (which could not be filled in the normal support area) are located through this step. The cost and size of these items vary from great to very small. Their importance, however, at the moment they make an aircraft inoperable is uniformly great.

As a follow-up, the Aviation Supply Office on the next day directs the shipment of the located items from the nearest activity where they are available to the requesting activity. This means that usually within 24 hours from the time the "unfillable" requisitions were submitted, eight-tenths of the items have been issued or are on their way to the user.

Secondary screening for residual items—On the third day, the items which were not found in this first screening (about 30 daily) are listed on a book teletype message which is sent to some 39 continental United States activities. Included in these are 8 Navy industrial activities which check their overhaul or repair capability for the items listed. These 39 activities include the original 18 screened the previous day by the communication network. This teletype message, known as "S. A. M residual message" lists also the items which are interchangeable with the items originally requested. All activities now make a physical warehouse stock check as well as a scanning of stock record cards. About 20 (or two-thirds of the 30 residual items searched) are found in this secondary screening, bringing the cumulative total of items located by S. A. M. to 93 percent. The items available or within quick repair capability of the overhaul points are then reported to the Aviation Supply Office for redistribution and shipment. The remaining items not located (usually about 10) are then placed under procurement. The following table summarizes this situation:

EMERGENCY REQUISITIONS PROCESSED DAILY

	Quantity	*Balance Outstanding*
Total requisitions submitted	3,000	
Filled locally—1st day	2,850	150
Filled 1st S. A. M. screen—2nd day	120	30
Filled 2nd S. A. M. screen—3rd & 4th day	20	10
Emergency action & procure—5th day	10	



Above chart indicates the drop in the rate of aircraft out of commission for parts after implementation of the SAM program on 15 December 1958. Charts of the rate prior to this period show a gradual rise to an overall high of 9%.

EXHIBIT 1

Final screening—The Navy's West Coast supply headquarters takes one additional step in expediting material to grounded aircraft. Every week this command lists all the unfilled emergency requisitions after screening by the S. A. M. system and airmails this list to all West Coast and Pacific Ocean area activities which are authorized to hold stock. This group includes ships and Marine Air

Groups, for a total of 54 addresses. The items on this list are then the object of an intensive search at all the locations. It has been our experience that about 70 percent of these remaining "dogs" are found in the first week of this search-in-depth. Occasionally, as a last resort, deployed aircraft requirements are filled by grounding a plane in the continental United States, from which a needed part is "cannibalized".

Results—The results of this expediting effort, taken as a whole, have been spectacular. One gauge of our fleet readiness is the percentage of our aircraft out of commission for parts. This rate for all aircraft in the Navy was 9 percent before S.A.M. Today it averages less than 4 percent (Exhibit 1). Another measure is the number of old, unfilled emergency requisitions. Before S.A.M., there were 100 to 150 emergency requisitions outstanding more than 21 days for the Pacific Ocean Area. Today there are less than 10 such requisitions outstanding over 10 days!

Fruitful Study of the Frequency of Exceptions

Initially, we developed the S. A. M. procedure to solve the difficulties which were occurring daily. But as we gained experience with the program, we realized that we had something more valuable in hand. Every day we were getting a report on the troublesome items for that day. Why not put these together over a given period and study them to see if we could detect any pattern from the difficulties, any clues to ways in which we could prevent difficulties in the future? We did this for the requisitions for a three-months period. We have since continued to analyze the data for the preceding three months. This has been called the "S.A.M. frequency study." What we have found is extremely interesting.

In a quarterly period, we usually process 7,000 requisitions in the program. These involve, however, only 3,700 separate items. This is less than 1 percent of the total active supply items in the system, which means that 476,300 items gave no supply trouble. Even more surprising is to find that only 610 items (of our half a million items) caused one-half of all emergency situations. Requisitions for these 610 items occurred anywhere from 3 to 63 times. Ninety of these items caused 10 or more failures each and accounted for 20 percent of all supply emergencies! It became clear that this group of items was the one needing special attention. Further analysis showed that, for over half of these troublesome 610 items, the problem could be solved by rather simple means, such as: (1) locating interchangeable stock, (2) re-positioning material from smaller activities, (3) expediting deliveries from contractors, and (4) stepping up our Navy overhaul or repair program for needed items.

We found, however, that on toward half of the crucial 610 items (275 to be exact) needed close management control in addition to the above measures. Among the things that we did were:

1. Maintain a perpetual central inventory and a daily reporting of receipts and issues.
2. Ration issues of some items to the highest priority user.
3. Require the return of a repairable item to a repair point in order to secure the issue of a new item. (Speeding the turn around of repairables).
4. Conduct engineering studies to determine the cause for failure of component parts when usage has been much greater than predicted.
5. Investigate maintenance practices where usage has been appreciably greater at one activity than at others.
6. Encourage horizontal communications between maintenance personnel and supply technicians. In many cases, we feel a great advantage has come about through this team-work, focusing on a relatively few items of supply at a time.

Lessons Learned Are Generally Applicable

Most concerns recognize the need for better inventory management. Many appreciate that electronic data processing and associated data transmission equipment afford an opportunity to achieve better inventory control. This equipment has made possible company-wide perpetual inventory and the solution of routine inventory matters by mathematical formula. In planning this type of approach, it is our recommendation that special management-by-exception techniques be considered as a natural supplement to automatic data processing. Our experience indicates the following steps are necessary to assure effective inventory control:

1. Divide the inventory into categories by value.
2. Place on daily automatic processing only those high-cost or critical items for which expected savings will justify the data handling expense. Lower valued inventory may be reported at longer intervals.
3. Retain sufficient unused capacity in the data transmission equipment so that items may be included which become critical in the future.
4. Establish a flexible procedure which will report emergency requirements, scan all stock sites for availability of the needed items, and direct shipment when indicated.

5. Prepare for top management an analysis of the items which are found to cause recurrent failures or unusual expense.
6. Take corrective action on the exceptional items which occur. This action will often involve coordination of several departments.
7. Place scarce items that are critical under special rationing control until the shortage is eliminated.

In summary, although full use should be made of data processing and transmission equipment in inventory management, it is important not to leave the solution of problems to the automatic application of a formula. In many ways, an unusual occurence is like a symptom in a disease. Laboratory tests will point up the existence of an exceptional condition, but it takes the wisdom of the doctor to decide on the cause and corrective action. Likewise, in inventory management, our new data processing techniques and our new formulas help us know quickly when something is going wrong, but it requires the knowledge of the inventory manager and his team to decide on the diagnosis and treatment.

Direct Costing and the No-Value Inventory

by PAUL H. VAN NESS*

EVERY ARTICLE on direct costing which I have read emphasizes its effect on the income statement. The advantages claimed by its adherents are familiar: profit is made to vary with sales instead of production, cost-volume-profit relationships are not distorted, etc.

However, the income statement does not stand by itself in the accounting system; it is inseparably related to the balance sheet. The accountant cannot adjust either while ignoring the repercussions on the other. The effect of direct costing on the balance sheet, particularly on inventory valuations, needs attention.

To display the problem, I have devised an example free of distractions. The ABC Company finds itself in the remarkable position of incurring no variable costs of production. Its plant is completely mechanized, its employees all enjoy a guaranteed an-

* Accountant, Corporate Accounting Division, Collins Radio Company, Cedar Rapids, Iowa.

nual wage, etc. Depreciation and payroll expenses total $30,000 per year. The capacity of the plant is 48,000 units per year. Unit cost is $ .625. During the first month of operations, the company produces 4,000 units, which is its normal capacity. In this same month, the company sells 2,000 units. Consequently, 2,000 units remain in inventory at the end of the month.

Absorption costing says that the company has an inventory of $1,250 (2,000 units @ $ .625). Direct costing says that all costs (of the ABC Company) must be expensed. It provides no clue on the ABC Company's balance sheet to the existence of salable goods in the company's possession. This result violates accounting principles, understates assets in total and undervalues the current ratio.

I know of no escape from this dilemma. If absorption costing misstates profits, it produces good inventory figures; if direct costing produces valid profits, it understates inventories. I know that there is what might be called a direct costing theory of inventories, i.e., that they should be valued at cost which need not be reincurred the next period. From this point of view, an inventory created by fixed costs would have no period-end value. However, I doubt that the company's board of directors would agree to this.

The possibility of making an entry for inventory valuation under direct costing exists and may be easily demonstrated by continuing the example of the ABC Company. However, such an expedient destroys the advantages claimed for direct costing. Suppose that the directors discover that the balance sheet will show no inventory, although they can see the items with their own eyes. Naturally, they insist on a balance sheet adjustment and, according to the accepted accounting principles, their demand is justified. The accountant makes the following entry (2,000 units @ $ .625):

Inventory	$1,250
Inventory valuation adjustments	$1,250

But the valuation adjustment account is an expense account, i.e., its balance enters into the computation of periodic income. The entry is identical in substance and effect, if not in appearance, with the absorption costing entry which defers the cost of goods remaining in inventory:

Finished goods	$1,250	
Cost of goods sold	$1,250	
Work in process		$2,500

Thus, the attempt to adjust the inventory destroys the advantage claimed for direct costing of making profit vary solely with sales. Profit here will depend also on the magnitude of the inventory adjustment.

Do accountants face a choice between mutually unattainable objectives, or is something wrong with direct costing in the first place?

Departmental Unit Cost Plan in an Insurance Company

by ROY K. COWAN

THE DEPARTMENTAL UNIT cost plan was introduced over five years ago at the Massachusetts Mutual Life Insurance Company in an effort to accomplish the following objectives:

1. Create a feeling of cost consciousness throughout the company.
2. Provide management with a comprehensive picture of cost trends in terms of the volume of work being performed.
3. Provide a basis for more objective and valid analyses of performance on the departmental level.
4. Encourage the use of work simplification techniques to bring about cost reduction.
5. Aid in the determination of the need for additional employees or, as an alternative, the need for a comprehensive systems study.

Weighted Production Units

As each production unit in a department is different, it is necessary to devise a means of reducing them to a common denominator. The only true common denominator of production is time. Time does not fluctuate. Therefore, if productive effort is defined in terms of standard minutes per unit of production, the measurement remains stable as long as the conditions under which it was established remain unchanged.

Under any system of conventional work measurement, many samples or timings are made before the expected time for performing a stated operation is obtained. Our problem had been to find a system that would enable us to determine this expected time as economically, accurately and rapidly as possible. This is done by the use of weight factors developed from work sampling.

One of the largest life insurance companies has developed a set of punched cards that enable the user to automatically randomize any mix of people and

---

ROY K. COWAN, Springfield Chapter, 1955, is Assistant Group Secretary with Massachusetts Mutual Life Insurance, Springfield, Mass., which he joined in 1926. Mr. Cowan holds a B.B.A. degree from the Northeastern University, Springfield, Mass.

work through the use of tabulating equipment. We have acquired a set of these cards and are using them as the basis for our work sample program. Essentially, a work sample is a series of instantaneous observations of random employees at random times. This means that, at random times during the course of the study, an employee will be asked to identify the task he is performing at the moment.

Work sampling is designed for those instances in which a close approximation is fully as useful to management as an exact measurement. It can be defined as the science of drawing conclusions about a large number of work items based on the actual study of a relatively few work items observed at random. This method depends on an established fact in statistics. For example, if the clerks in a cost center perform two operations, A and B, and if Operation A is found in 70 percent of the observations and Operation B in 30 percent, then, assuming that the number of observations is adequate, the clerks are spending 70 percent of their time on Operation A and 30 percent on Operation B. The accuracy of this method depends primarily on the number of observations and can be established by a statistical formula. It should be emphasized at this point that almost never in the measurement of human effort is it possible or even desirable to observe every single activity.

The end results of a work sample study are minutes per unit or clerical work standards. For unit cost purposes, we are concerned only with the categories of work for which permanent production counts are available. Generally speaking, if six or less tasks account for about 75 percent of the productive time of the department, we treat all other items as overhead and absorb them into the department's costs. Once these permanent clerical work standards have been established by work sampling and, in some cases, checked by time study or methods time measurement (M.T.M.) and accepted by the department head, they become weight factors to be used under the unit cost plan. As such, they will be revised only when the content of the job is changed. It is the intent of the unit cost program that weight factors not be revised in the event of job improvement by the use of such techniques as work simplification but only if part of a job is transferred out or if a job is enlarged.

From the above discussion, it can be readily understood that the accurate portrayal of a department's cost trend depends on the manager's accuracy in reporting monthly his existing production counts, his promptness in notifying the cost and standards section of all changes in the job content of existing work and his requesting the establishment of a clerical work standard for all special jobs.

Unit Cost and Cost Elements

The type of unit cost developed by this plan is purely departmental and is peculiar to the department concerned. It deals with the cost of production units of departments, regardless of how many functions are being performed in each.

The resulting cost per unit is shown on both a gross and a net basis. The gross cost is based on the total direct salary cost, irrespective of the amount of time paid for but not worked, together with the equipment rental cost. The net cost gives proper credit for direct salary cost for nonproductive hours, namely, vacation and illness. These gross and net unit costs are reported to management on a monthly unit cost report. Only two cost elements, salary and equipment rental expense, are used, because they account for about 75 percent of the total expense of most departments and are the principal areas of expense over which operating heads have some control. Another reason for selecting these two elements is their frequent inter-relationship. The purchase of modern machines often causes a reduction in salary expense that is partially offset by the cost of the equipment.

Monthly Unit Cost Report

The Monthly Unit Cost Report (Exhibit 1) is divided into three general sections: production, expense and unit cost.

On the left-hand side of the report, the actual units of production, as reported by the department manager, are multiplied by the weight factors to derive the weighted production. These are then totaled to derive the total weighted production.

The expense section of the monthly unit cost report is divided into two sections: (1) "clerical and technical titled" section and (2) "total" section, which comprises the total of the former section plus all "management titled" employees, i.e., those participating in the overall supervision of the department.

The totals first of current month are brought forward from totals end of current month on the previous month's report. The expense portion represents one-twelfth of the annual salary expense. The totals first of current month, plus new employees, plus salary increases, less terminated employees, equals totals end of current month.

As the salary expense is computed on the basis of one-twelfth of the annual expense, and production is based on the number of working days in the month, it is necessary to apply an adjustment factor to the salary expense, to make the two elements comparable.

MONTHLY UNIT COST REPORT

Department Premium Acct. New Issues Changes & Gov't Allot. Month December 19 58

PRODUCTION

CODE	TOTAL UNITS PRODUCED DURING MONTH	WEIGHT FACTOR	WEIGHTED PRODUCTION
A	7,632	.26	1,984
B	6,674	5.68	36,632
C	6,984	.24	1,682
D	205	1.20	247
E	1,023	1.04	1,064
F	374	14.30	5,348
G	41	11.05	453
H	7,461	.65	4,853
I	8,250	.12	988
J	204	4.12	840
K	--	4.87	--
L	7,880	.23	1,814
M	4,005	4.32	17,302
N	3,458	4.34	15,008
O	4,014	14.93	59,929
P	1,552	12.27	19,043
Q	409	17.28	8,450
R	583	21.16	12,335
S	65	11.11	722
T	254	21.39	5,647
U	267	9.12	2,435
V	111	16.72	1,856
W	1,163	9.85	11,456
X	207	6.23	1,290
Y	124	9.33	1,157
Z	87	6.15	535
A-1	--	.91	--
B-1	418	5.71	2,387
C-1	97	1.95	189
D-1	35	8.58	300
E-1	234	1.06	248
F-1	49	3.27	160
G-1	167	37.43	6,251
H-1	510	6.18	3,152
I-1	144	48.36	6,964
J-1	38.50	9.88	380
K-1	1,295	.64	829
L-1	266	3.75	998
TOTAL WEIGHTED PRODUCTION		(1)	236,919

EXPENSE

ITEM	CLERICAL & TECH. SALARY EXPENSE (a)	CLERICAL & TECH. NO. EMP. (a1)	TOTAL SALARY EXPENSE (c)	TOTAL NO. EMP. (c1)
(2) TOTALS FIRST OF CURRENT MONTH	$9,356	32.00	$ 10,477	34.00
Add: Employees hired during current month (PTP & TEMP)	-----	-----	-----	-----
Salary Increases	28	XXX	28	XXX
Deduct: Terminations or Transfers during current month (PTP & TEMP)	646	2.00	646	2.00
(3) TOTALS END OF CURRENT MONTH	$8,738	30.00	$ 9,859	32.00
ADJUSTMENT FACTOR (A, C = .9944)	$8,689	30.00	$ 9,804	32.00
Add: Time worked by terminated or Transferred Employees	389	1.20	389	1.20
Overtime	428	1.18	428	1.18
Part-Time Employees	-----	-----	-----	-----
Borrowed Employees	-----	-----	-----	-----
Bonus	-----	XXX	-----	XXX
Deduct: Time from 1st of month to starting dates of New Employees	-----	-----	-----	-----
Loaned Employees	316	1.08	316	1.08
(4) GROSS SALARY & NO. OF EMP.	$9,190	31.30	$ 10,305	33.30
Deduct: Earned Time Taken, Time without Pay and Sickness	571	1.96	571	1.96
(5) NET SALARY & NO. OF EMP.	$8,619	29.34	$ 9,734	31.34

UNIT COST

	GROSS		NET	
	CLERICAL ETC.	TOTAL	CLERICAL ETC.	TOTAL
(6) SALARY EXPENSE	9,190	10,305	8,619	9,734
Add Furniture & Equipment Exp.	201	201	201	201
(7) TOTAL ADJUSTED EXPENSE	9,391	10,506	8,820	9,935
(8) UNIT COST FOR MONTH (7 divided by 1)	.0396	.0443	.0372	.0419

(9) NO. OF WORKING DAYS: 20.8

(10) AVERAGE DAILY PRODUCTION PER EMPLOYEE (1 divided by 9a divided by 9): 388

REMARKS:

Date: January 13, 1959 Signed: [signature]

EXHIBIT 1

The expense portion is computed by using the average hourly rate for the month, or specific employee hourly rates where the employee is named, times the hours reported. The number of employees is computed by dividing the total hours reported for each item by the total number of working hours in the current month for one employee. This is referred to below as the employee equivalent.

Time worked by terminated or transferred employees is a charge for the salary expense and employee equivalent prior to the effective date of termination, made in order to offset the full month's credit for termination.

Overtime is computed by multiplying the straight-time hours of overtime by average hourly rate plus the overtime hours over 40 hours multiplied by the overtime hourly rate (average hourly rate multiplied by $1\frac{1}{2}$).

As the total hours worked each month and the hourly rates of part-time employees vary widely, it is necessary to compute the salary expense using the total hours of work and the hourly rates for each individual. The employee equivalent is also computed.

The borrowed employees item usually contains individual hours and hourly rates used to compute the salary expense. If not, the average hourly rate of the borrowing department is used. The employee equivalent is also computed.

In incentive departments, the total bonus paid during the month is included in salary expense. No employee equivalent is computed.

In order to offset the above charge for new employees, a credit is made for the salary expense and employee equivalent from the first of the month to the effective date of employment. As to the loaned employees item, it is used to compute the salary expense whenever individual hours and hourly rates are reported. Otherwise, the average hourly rate of the department is used. The employee equivalent is also computed.

The gross salary and number of employees is derived by adding and deducting the above items from the adjusted expense. Earned time taken, time taken without pay and sickness to be deducted from it represents the total hours reported multiplied by the average hourly rate. The employee equivalent is also computed.

Net salary and number of employees represent the differences between the gross salary and number of employees and the above deduction for earned time taken, time without pay and sickness.

Gross and net salary expense for both clerical and technical titled and total, as derived above, plus furniture and equipment rental expense, are then translated into a unit cost for the month by dividing it by the total weighted production.

Number of working days in month represents the number of working days in the month for one employee. The total weighted production divided by the net number of employees (5, Col. B, representing the actual number of employees performing the work) divided by the number of working days in the month equals the average daily production per employee.

Of the results obtained above, the gross clerical and the net clerical unit cost

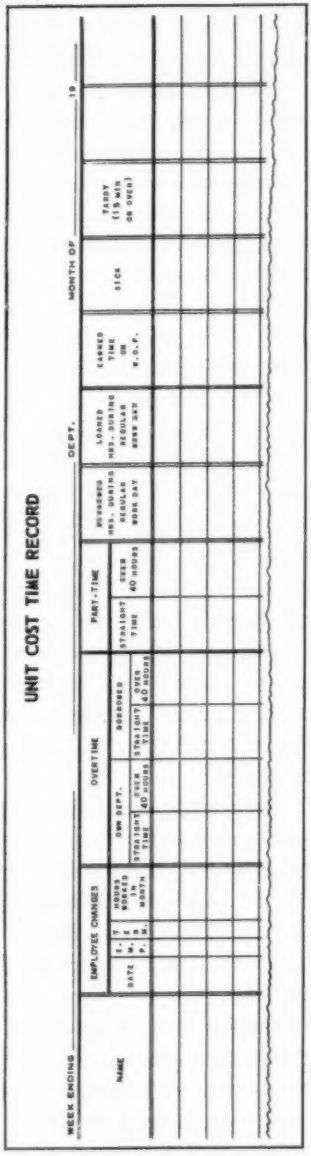
are the most significant because they represent the gross and net cost for the month of the weighted units of work produced.

Records Used in Administering the Unit Cost Plan

Unit Cost Reporting Key. After the weight factors have been developed by the work sample study (which is usually conducted during a one-month period), they are presented in the form of a complete list of the categories of work being measured in the department or cost center, together with weight factors currently assigned to each. All changes in either categories of work or weight factors should be reflected to keep this list on a current basis.

Unit Cost Time Record (Exhibit 2) has been designed to perform a dual function. First, it is used to record weekly from the weekly time cards such adjustments as personnel changes, earned time, sickness, etc. Secondly, by summarizing, on a separate form the weekly totals of the above, it provides the necessary data for preparing the monthly report of adjustments for unit cost indices.

Information should be furnished in hours, 7:30 for example, not days. Overtime hours for titled employees are not reported. Nonproductive hours (company business, commissary, etc., but not earned time and sickness) can be shown in total rather than by employee. All earned time or time with-


UNIT COST TIME RECORD

WEEK ENDING _____ DEPT. _____ MONTH OF _____ 19 _____

NAME	EMPLOYEE CHANGES: DATE	EMPLOYEE CHANGES: I. T. M. E. P. B.	HOURS WORKED LAST MONTH	OVERTIME: OWN DEPT. STRAIGHT TIME	OVERTIME: OWN DEPT. OVER 40 HOURS	OVERTIME: BORROWED STRAIGHT TIME	OVERTIME: BORROWED OVER 40 HOURS	PART-TIME: STRAIGHT TIME	PART-TIME: OVER 40 HOURS	WITHDREW HRS. DURING REGULAR WORK DAY	LOADED HRS. DURING REGULAR WORK DAY	EARNED TIME ON W.O.P.	SICK	TARDY (15 MIN OR OVER)	

EXHIBIT 2

out pay and all sick time, with or without pay, during the month should be entered, as well as tardiness of over 30 minutes for clerical employees only. The remaining two columns are available for the recording of hours spent on special jobs that must be included for proper production credit. In addition,

MONTHLY REPORT OF ADJUSTMENTS FOR UNIT COST INDICES

Department_____ Month _____

NEW EMPLOYEES		FOR USE BY COST SECTION
NAME	DATE	

SALARY INCREASES TO BE ENTERED BY COST SECTION		
CLERICAL		
TITLED		

TERMINATED EMPLOYEES		
NAME	DATE	

OVERTIME			
	STRAIGHT TIME HOURS	OVER 40 HOURS	
OWN DEPARTMENT			
BORROWED			

PART TIME			
	STRAIGHT TIME HOURS	OVER 40 HOURS	

BORROWED TIME		FOR USE BY COST SECTION
LENDING SECTION AND NAME OF EMPLOYEE	STRAIGHT TIME HOURS	

BONUS (TOTAL FOR MONTH)		
LOANED TIME		
BORROWING SECTION, OR PURPOSE	STRAIGHT TIME HOURS	

NON-PRODUCTIVE HOURS		
	STRAIGHT TIME HOURS	

FURNITURE AND EQUIPMENT RENTAL EXPENSE (TO BE FILLED IN BY COST SECTION)	
TUBE SERVICE (TO BE FILLED IN BY COST SECTION)	

EXHIBIT 3

the earned time and sickness hours for other than those titled employees which will be shown in the clerical and technical titled section of Exhibit 1 should be shown at the bottom of the unit cost time record so that proper credit can be given on the total columns of the monthly unit cost report. At the end of the month, the data on the unit cost time record should be recorded on the Monthly Report of Adjustments for Unit Cost Indices.

Record of Units of Production

Name _____ Date _____

New Issues

New Issue Preparation	____	Checking New Issues	____
writing New Issues	____	D. C. Check	____
Manual Changes		Record Card Corrections	____
(a) Sorting Not Inc. "Y's"	____	Cancelled Career Contracts	____
(b) Changes, No App. Required	____		
(c) Straights	____	Filing & Sorting Renewal Cards	____
(d) Off-Anniversary	____		
(e) Off-Anniversary P.T.'s	____		

Changes

Assemblying Punched Cards	____	Agency Transfers	____
Typing Premium Records (Inc. Each Item of Gen. Corr.)	____	Agency Transcripts	____
		Att. of Dis. and A.D.B.	____
Policy Changes, Rat. Ads., T 5 Ren., S.F.C., Fin. Prem., Rem. or Add. to P.S.	____	Commission Quotations	____
		Cost to Make Pd. Up in Full	____
Revivals, Premium Changes	____	Feature Ceases	____
Triple M Conversions	____		

Government Allotment

Processing Abstracts		Policy Changes	
Additions	____	Additions to G.A.	____
Changes	____	Changes to Personnel	____
Discontinueds	____	Changes from P.C. Group	____
Manual Changes	____	Correspondence, Dictated	
Booking Personal Payments	____	Letters, Etc.	____
Monthly Agency Allotment Follow-Up		Filing Cards	
Letters	____	Masters - Active (Inches	____
Lapses	____	Premium Record Cards	____
Requisitioning Punched Cards on New G.A. #980 Cases	____	Status Inquiries	____

EXHIBIT 4

Monthly Report of Adjustments for Unit Cost Indices (Exhibit 3) is used to report the adjustments recorded on the unit cost time record. In addition, it is used by the cost and standards section as a worksheet in preparing the monthly unit cost report.

Record of Units of Production (Exhibit 4) is an example of the records maintained daily by a typical cost center for its daily production count. At the end of each month, the data on the individual daily forms is summarized on one form which is sent to the cost and standards section as representing the production counts for the month.

Whenever a new job, other than a one-time special job, is added to a department's operations or there is a change in the routine of an existing job, the department manager should notify the cost and standards sections as soon as possible so that a clerical work standard can be assigned or an existing one reviewed. In this way, proper credit will be given for the units of production.

The cost and standards section should also be notified as soon as possible of all special jobs so that an interim clerical work standard can be established if the job is of sufficient duration. If this is done, only the units of production for the month need be reported. If no interim standard can be established, the units of production are reported, together with the hours worked in total, so that a standard based on the department's current efficiency can be computed. If units of production are not available, the hours worked are reported in total by employee so that the proper credit can be given the department by including this as "loaned time" under the expense portion of the report.

Unit Cost Summary (Exhibit 5) provides the department manager with the pertinent facts from the monthly unit cost reports. Each month, upon receipt of his monthly unit cost report, the department manager enters the results in the columns provided on the summary. At the end of the year, he computes the monthly average by adding each column and dividing by the number of months involved.

The Graph entitled *Net Clerical Unit Cost* (Exhibit 6) presents, in a form that can be readily understood, two of the more important results shown on the monthly unit cost report, i.e., the gross and the net clerical unit cost. As the summary is on a calendar year basis, the graph paper is also on a similar basis. In addition, a three-year graph is provided immediately behind the current year graph as an indicator of the direction of costs over a longer period. The difference between those two unit costs represents the earned time and sickness expense of the department for the month. However, of the two, the net clerical unit cost is considered the more significant.

In viewing the graph, one should observe the direction of costs and not the relative position of any one month. For this reason, it is desirable to plot a trend line. The simplest method of doing this is to make use of a transparent ruler, eliminating from consideration in locating the line both excessively high or low plotted points.

19 58 UNIT COST SUMMARY

Prem. Acctg.-New Issues, Changes & Govt. Allot. DEPARTMENT

CLERICAL & TECHNICAL TITLED UNIT COST

MONTH	NET MONTHLY EXPENSE (7C)	UNIT COST GROSS (8A)	UNIT COST NET (8C)	NET ADJ. NO. EMPLOYEES (8D)	TOTAL WEIGHTED PRODUCTION (1)	NO. WORKING DAYS IN MONTH (9)	AVERAGE DAILY PRODUCTION PER EMP. (10)
JANUARY							
FEBRUARY							
MARCH							
APRIL							
MAY							
JUNE							
JULY							
AUGUST	7,043	.0456	.0372	24.67	189,135	21	365
SEPTEMBER	7,495	.0442	.0376	25.54	199,363	21	372
OCTOBER	7,865	.0423	.0370	24.90	212,530	22	388
NOVEMBER *	7,504	.0389	.0343	28.82	218,758	18	422
DECEMBER	8,820	.0396	.0372	29.34	236,919	20.8	388
MON. AVG.							

TOTAL UNIT COST

MONTH	NET MONTHLY EXPENSE (7G)	UNIT COST GROSS (8E)	UNIT COST NET (8G)	NET ADJ. NO. EMPLOYEES (8D)
JANUARY				
AUGUST	8,136	.0514	.0430	27.27
SEPTEMBER	8,422	.0477	.0422	27.27
OCTOBER	8,945	.0478	.0421	26.78
NOVEMBER *	8,468	.0433	.0387	30.82
DECEMBER	9,935	.0443	.0419	31.34
MON. AVG.				

* November 1958
Includes Government Allot.

EXHIBIT 5

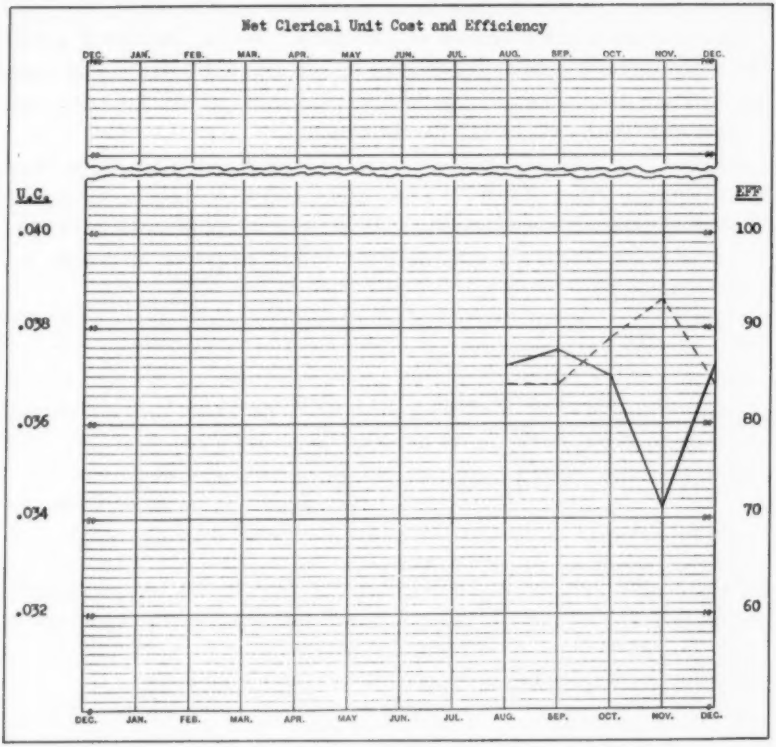


EXHIBIT 6

Supplemental Data

Average daily production per employee gives a general indication of cyclical production fluctuations in total on a weighted basis. At best, this is in broad terms and is useful only as a general indication. In order to derive a more accurate portrayal, it is necessary to plot actual daily units of production on a yearly or a continuing basis, so that there can easily be seen also those fluctuations which are not apparent when average is derived on a monthly basis. In addition, daily production data can be used to determine statistically computed optimum staffing levels.

The average daily production per employee result shows what is being done and not what could be done. In order to determine what could be done, we

must first determine at what productive level (utilization) the department is currently operating. It must be remembered that even a small increase in utilization results in a considerable increase in production. For example, let us assume that a department is operating at 60 percent utilization and producing 200 units per employee daily. By increasing the utilization to 70 percent, 233 units could be produced, which means a 16.5 percent increase.

An increasing volume of production can be handled only either by increased utilization or by increased staff. It is well to note that no one, as a matter of practice, can be expected to work every minute of the day. Our work sample studies to date show the following average breakdown of the nonproductive time per day for one employee:

			Minutes
Total			450
Less:			
Idle—lack of work	.76%	3	
Talking—personal	6.48%	29	
Personal time	2.54%	11	
Not in department	5.92%	27	
Absent	6.36%	29	99
Net			351

Some of this time can be considered management reserve and, on occasion, can be used productively. However, it is well that the department manager be aware of the extent of his department's nonproductive time and keep it at a minimum. In this way, he can increase his department's utilization.

Overtime requirements can be readily determined by knowing the number of units of a given piece of work awaiting completion, as follows: Number of units of work X Clerical work standard = Total standard minutes. However, the actual minutes necessary to do the work will depend on the rate of utilization (efficiency) of the department. The standards (weight factors) that have been established by our work sampling approach the average time for completing a unit of work at the time the sample was taken. These standards do not include any allowances for nonproductive time. For this reason, it would be incorrect to assume that the actual minutes would be the same as the standard minutes. Therefore, the total standard minutes must be adjusted to properly reflect the nonproductive time, as follows:

$$\frac{\text{Total standard minutes}}{\text{Rate (\%) of utilization}} = \text{Actual minutes required.}$$

Audit of utilization computation. The unit cost reports provide an excellent audit of the department's time utilization as computed by the work measurement

program. This is done in the following manner from data secured from Exhibit 1: (1) net number of employees multiplied by number of working days multiplied by 450 minutes equals total net available minutes, (2) total weighted production (this is actually total standard minutes), divided by total net available minutes equals percentage of time utilization.

Limitations of Unit Cost Program

While the unit cost plan is a useful tool, it has some limitations which should be recognized by any company which wishes to use it.

First, since only salary and machine depreciation costs are taken into account, it represents a limited form of cost accounting. The theory under which the plan operates is that certain other related expenses will automatically also be controlled. It is generally conceded, however, that such unit cost figures cannot be expected to provide more than certain relatively obvious and general explanations for changes taking place, but they do perform the important service of drawing to the attention of those responsible for department operations the fact that something is producing an adverse effect.

Second, care should be used in selecting the departments in which the plan is to be installed. The plan has not operated successfully in departments in which the weight factors for certain tasks represented the average time to complete units of work, each of which took widely varying amounts of time to produce. For example, in our group pension actuarial department, we experienced greatly fluctuating unit costs from month to month after installation of the plan. The cause was traced to the tasks having to do with year-end calculations, some of which could be done in one or two hours while others would take one or more days. If the mix of cases in a particular month happened to involve an unusually large quantity of cases requiring one or more days to complete the calculation, the application of the standard weight factor to that month's production would produce a distorted unit cost.

Sampling and Statistics in Accounting Practice

by HAROLD W. FOX*

ACCOUNTANTS have conflicting views about the appropriateness of statistical sampling in their work. The issue affects all who must estimate an entity from knowledge of some parts —a common occurrence in the confirmation of receivables, control of clerical costs, installation of procedures or the segregation of fixed and variable costs.

Any sampling carries some risk that the results will lead to a wrong inference. With a statistical design, the magnitude of sampling error can be approximated. It enables a deliberate balance between cost and risk factors. Statistical sampling can be useful for extracting the content of a large mass of data; statistical quality control techniques are adaptable to the screening of accounting output. Thus, the accuracy of key-punching, posting, coding, etc., which is allowed to enter into the accounting stream, can be kept within acceptable tolerance limits.

In auditing, too, statistical sampling is helpful. Some public accounting firms have constructed statistical tables and sampling plans reflecting their experience. They are put to use for exploring accounting records and for comparing the findings with the results of conventional approaches. Again, statistical methods may serve for testing distinct segments, say, parts inventories.

Still, many problems remain. The rigidity of elaborate statistical procedures may disrupt the accounting routine. Another obstacle is that published tables developed for other purposes often are not applicable to accounting data.

Statistical methods should not be a substitute for more incisive accounting tools—matching of separately created media such as orders to invoices, installation of bookkeeping machines, etc. Frequently, these procedures secure internal control and bring cost savings as well. Advocacy of statistical sampling in auditing sometimes rests on the fallacy that only a check on the accuracy of entries is involved. But auditing is an investigation into the fairness of financial statements. Statistical sampling is usually impractical for tracing interlocking records and for checking internal control.

It appears that accountants will employ statistical sampling increasingly as they learn its techniques and appreciate its values and limitations. Like other scientific tools, it cannot replace sound and creative thinking.

* Head of Management Services, Rowe Manfacturing Co., Inc., Whippany, New Jersey, and Instructor at the Graduate School, Fairleigh Dickinson University, Madison, N. J.

Developing Order Points and Quantities for Inventory Control

by R. P. CARROLL and F. E. SCHNEIDER

IN RECENT YEARS the increase in the number of items carried in our stores inventories has resulted in studies to control our inventories by use of mathematical and statistical methods. At many of our plants, setting order points and determining quantities to order was done on an intuitive judgment basis resulting from experience. In order to develop uniform methods applicable to all our plants, a task force was set up to study and recommend procedures for scientific control of the stores inventories.

Determining Order Points

Three factors basic to a scientific calculation of the order point are the rate of consumption, the period of time from requisitioning material until the delivery date (lead time) and the amount of safety stock that should be allowed for variations in the first two factors from the norm and for emergencies. If we assume that there is to be no safety stock, then the order point is simply the product of the daily rate of consumption and the lead time. The usual method of expressing this formula is to take the annual usage (divided by 365) times the lead time, or

$$\frac{Rt}{365} = \text{Order point where } R = \text{annual usage (units) } t = \text{lead time}$$

It is obvious that these two factors are subject to variations from period to period and that these variations must be taken into account, which results in the necessity of providing the additional factor of safety stock.

At this point the formula was turned over to our mathematicians who, by the use of probability formulas, developed a series of constant factors to be used for different levels of risk.

RICHARD P. CARROLL, Newark Chapter, 1953, C.P.A., is associated with Union Carbide Corporation's Internal Audits Department at New York, N. Y. Formerly, he was employed by Haskins & Sells, C.P.A.'s, Newark, N. J.

FRANK E. SCHNEIDER is Assistant Manager in Union Carbide Corporation's Internal Audits Department. He became associated with this company in 1942, upon graduation from Manhattan College.

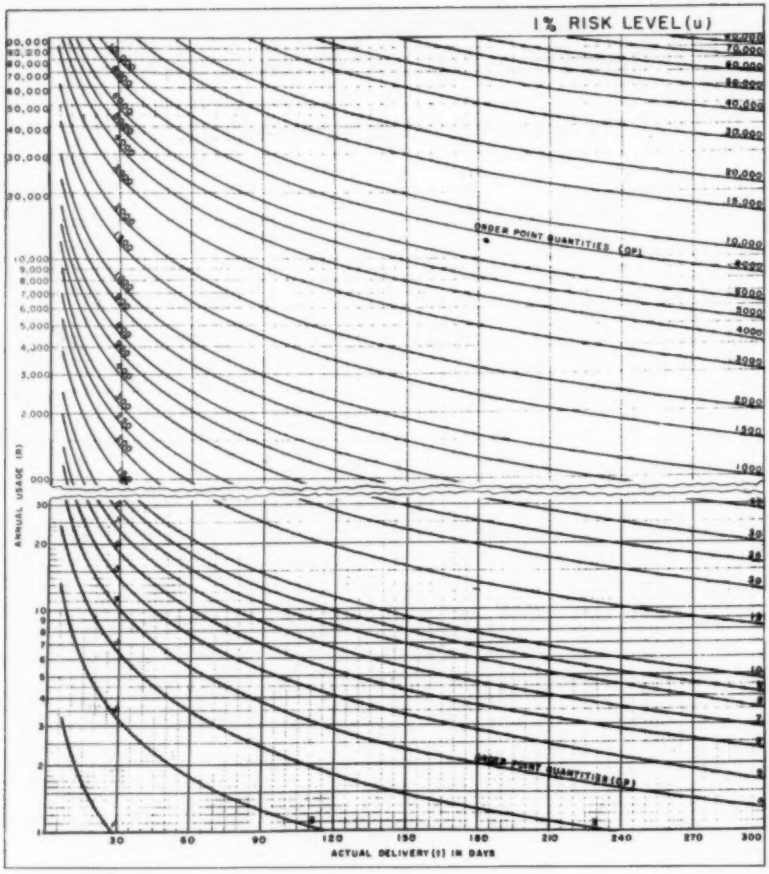


EXHIBIT 1

As a result of this study the simple formula, $\frac{Rt}{365}$ was expanded to the following:

$$\left[\frac{R}{365} \times (t + u\sqrt{t})\right] + \left[u\sqrt{\frac{R \times (t + u\sqrt{t})}{365}}\right]$$

where

R = annual usage, t = lead time, u = risk level constant

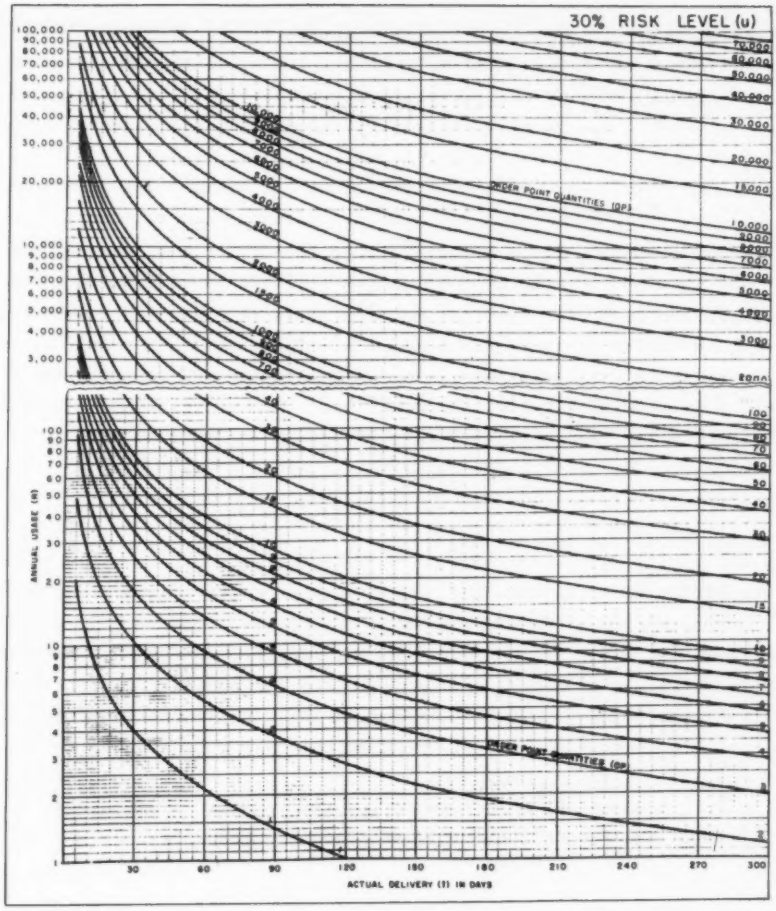


EXHIBIT 2

With such a formula, the task becomes seemingly hopeless but, fortunately, further refinements by our mathematical experts resulted in a practical solution for the application of the formula. The solution involves the use of a series of charts which were developed by assuming five levels of risk. For each risk level a different constant (u in the formula) is used. The curves on these charts represent the order point to be used for items having various levels of annual usage and/or average lead time. Once we decide upon the level of risk we are willing to assume, it is merely a mechanical matter to learn to read the

charts properly to establish our order points. For example, using the chart for 1% degree of risk (Exhibit 1), we find where:

$R = 1000$
$t = 30$ or, using the 30% chart (Exhibit 2) $O.P. = 100$
$O.P. = 150$

Management must evaluate the degree of risk it wishes to take that there will be an out-of-stock condition, but this is the only decision required of management as long as the charts are correct. Although we do not claim infallability for the method we have adopted, we have found that it has been very useful to management in pinning down the causes of out-of-stock conditions, and has resulted in reductions of stock on hand without undue risk. Also, it has pointed up situations where it is advantageous for our purchasing departments to strive for improved delivery schedules. Our internal auditing department has also found the charts useful for evaluating inventory levels at the plants.

Economic Order Quantities

Having disposed of the order point level in a satisfactory manner, we were confronted with the much more difficult problem of determining the proper quantities to order. The problem is one of determining the proper relationship between the cost of carrying inventory and the cost of processing requisitions.

A formula was developed to express the average inventory value for any item. The development of this expression follows:

RC = annual usage in dollars
where
R = annual usage in units
C = average unit cost.

$\frac{RC}{2}$ = average inventory value if one order is placed per year (average inventory value should always work out to ½ of the amount ordered).

$\frac{RC}{2} \times \frac{1}{2}$ = average inventory value if two orders are placed per year.

$\frac{RC}{2} \times \frac{1}{N}$ = average inventory value if N orders are placed per year.

or

$$\frac{RC}{2N}$$

What we have done so far is to develop the expression which represents the average inventory value for any item. Now, if we determine the variable cost of carrying inventory and express it as a percentage K of inventory value, we may use the following formula to represent the *cost* of carrying inventory:

$$\frac{RC}{2N} \times K \text{ or } \frac{RCK}{2N}$$

The method for determining the factor to be used for K will be discussed later.

The second important factor necessary to determine the economic order quantity is to determine the cost per requisition. If N equals the number of orders and S equals the variable cost per order, the formula NS would represent the cost of placing N orders.

The next step in deriving an economic order formula is to determine the relationship between the two factors we have been discussing. It is noted that there is a common factor in each of these expressions, namely, N, or the number of orders. In the first formula, since N is the divisor, the cost of carrying inventory will decrease as N increases. In the second, NS, N is a multiplier so that the cost of purchasing will increase as N increases. If we were to plot these two factors on a graph in which the cost and number of orders are shown, we would obtain a descending curve for the first formula and a straight ascending line for NS, as illustrated in Exhibit 3.

If we consider the total cost (order cost plus inventory cost), the optimum cost conditions will prevail when these two lines intersect. In other words, when the cost to order is equal to the cost of carrying inventory, we obtained the lowest total costs.

In order to develop an economic order quantity, we must express the number of orders in terms of quantity per order, or Q. This may be done as follows:

where

N = number of orders
R = annual usage

then the quantity of each order

would be $\frac{R}{N}$

So if $Q = \frac{R}{N}$, then $N = \frac{R}{Q}$

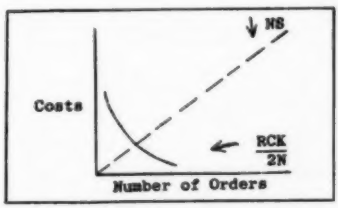


EXHIBIT 3

If we substitute this factor for N in each of the formulas already given, they may now be written as follows:

$$NS = \frac{RS}{Q}$$

$$\frac{RCK}{2N} = \left(\frac{RCK}{\frac{2R}{Q}}\right) \text{ or } \left(\frac{RCK}{1} \times \frac{Q}{2R}\right) \text{ or } \left(\frac{KCQ}{2}\right)$$

As has been demonstrated, the optimum cost conditions exist when cost to order equals cost of carrying the inventory. We may, therefore, express the economic order quantity by equating the two factors as follows:

$$\frac{RS}{Q} = \frac{KCQ}{2}$$

We solve for Q by the following steps:

$$\frac{RS}{Q} = \frac{KCQ}{2} \qquad 2RS = KCQ^2 \qquad Q^2 = \frac{2RS}{KC} \qquad Q = \sqrt{\frac{2RS}{KC}}$$

where

Q = economic order quantity S = cost per order
R = annual usage K = carrying cost of inventory
C = unit cost

Thus we have a formula which states that the most economic order quantity is the square root of two times the annual usage times the cost per order divided by the cost per unit of carrying the inventory.

Since solving the square root formula for even a small number of items would entail considerable work, a number of short cuts have been developed using tables, charts and specially designed slide rules. To permit quick calculations, most of these methods require the use of fixed values for cost of order S and cost of carrying inventory K. Using a constant multiplier the formula then becomes:

$$\text{Constant} \quad \text{X} \quad \sqrt{\frac{R}{C}}$$

Our engineers have developed a slide rule incorporating the factors in the economic order quantity formula. With a little instruction, this slide rule can be used by our inventory personnel as a means of determining amounts to order without their necessarily knowing the theory behind it. The slide rule provides for scales of annual usage up to 10,000 units and unit costs from $.01 to $100.00. This slide rule has "built in" values for S and for K but it provides for adjustments in either of these constants.

The problem of determining what values to use for cost of order S and cost of carrying inventory K remains. However, we have found that these factors are different for each plant. Without going into an extended discussion of this matter, it is necessary to make the point that the degree of error in the constant multiplier has a much smaller effect on the final answer than is immediately apparent. This is because all the terms of the formula are under a square root sign.

Another matter to consider is that, if the cost of purchase is overstated, and the inventory carrying cost is understated, the solution of the formula will overstate the economic order quantity. In using this device as an auditing tool, we have been choosing values on the high side for S and on the low side for K. If the order quantities are still below the order quantities actually in use, there is a strong indication that the present practice is unsound and uneconomical.

Balance Between Costs of Having and Getting

Although determination of order points and the economic order quantities may not be the final answer as a tool for inventory control, it has proven to be a valuable aid in the plants which have adopted its use. It has provided an objective control device for maintaining the proper balance between inventory carrying costs and costs of acquisition, and has been useful in isolating areas for cost reduction.

It's the Situation—Not the System—That Counts

by JOHN P. KIDNEY*

I AM DEEPLY concerned over the tone of articles that have been published during the past several years on direct costing, its pros and cons, and on total cost, expounding its advantages over direct cost. My feeling of anxiety is caused by the implication of a single "one best method" of cost accounting and not by the text of the articles. The presentations of these articles, in most cases, have been complete in detail and well documented.

Accountants are frequently champions of "pet" methods or theories, with the result that they are regarded by top management as necessary overhead. We, as accountants, have an obligation to our profession, employers and ourselves to overcome the atttitude that we are a necessary evil. Accountants are a part of top management and should be the guiding force to improving management technique. However, we will not reach the pinnacle of our progression by single application of our "pet" system or theory. We have a responsibility to understand the operating information needs of our company for decision-making purposes. The accountant is a bookkeeper until he has digested: (1) the specific company information requirements to the making of logical decisions, (2) the report comprehension of the personalities with which he must deal and (3) the approach to a plan for educating management, if a change in accounting system is desirable.

Direct costing or total absorption costing systems are expensive luxuries over and above a simple income statement, if the accountant applies either without complete understanding and acceptance of purpose by the other members of management. The properly prepared and educated management group can adopt either direct costing or total absorption costing satisfactorily. The pros and cons for either system are endless chains, but the fact that the system was chosen and understood by the people who have to use it for guidance is the most important ingredient for consideration. The continuity of the system whether it be direct costing or total absorption costing is the second largest factor of importance, once the system is familiar to the operating team, because uniformity of method permits both easier forward planning and historical comparison.

I am sure the intent of articles published in the *N. A. A. Bulletin* is not that of a cure-all endorsement of either system, but I felt an expression of opinion might be in order.

* Controller, Industrial Products Division, The Pillsbury Company, Minneapolis, Minnesota.

Rapid Reference Charts for Economical Production Order Quantities

by ROBERT H. OLINE

THE CONVENTIONAL FORMULA for determining economical ordering quantities in replenishing inventories of stock items may be expressed as:

$$Q = \sqrt{\frac{24MS}{KP}} \quad \text{where}$$

Q = Economical ordering quantity
M = Monthly usage rate
S = Set-up and ordering costs
K = Annual cost of carrying inventory per dollar of inventory value
P = Unit piece cost

This formula obtains the ordering quantity or lot size representing the point at which the annual cost of carrying inventory equals the annual cost of making set-ups and processing order paperwork. This is the point at which the sum total of these costs is at a minimum and therefore is the economical lot size to order.

With known values for some of these items, it is possible to simplify the formula in particular applications. In developing inventory control procedures for a machinery manufacturing company, the cost of processing order paperwork and of carrying inventory were determined as follows:

Cost of processing a manufacturing order	$1.50
Annual cost of carrying inventory:	
Obsolescence and deterioration	10%
Return on investment	10%
Handling and storage costs	5%
Total	25%
Cost per inventory dollar	$ .25

Using these values, the formula was reduced to

$$Q = 10\sqrt{\frac{M(1.50 + S.U.)}{P}} \quad \text{where}$$

M = Monthly usage
S.U. = Set-up cost (total for all operations on a manufacturing order)
P = Unit piece cost

ROBERT H. OLINE, Providence Chapter, 1960, is with the Management Services Division of Comery, Davison & Jacobson, Certified Public Accountants, Providence, R. I.

Inapplicability of the Alignment Chart Approach

An approach frequently used to further simplify the routine calculation and revision of ordering quantities is to construct a nomograph or alignment chart. Such a chart based on the above formula would provide an adequate means of calculating ordering quantities to be used in replenishing stock parts if the volume of calculations were reasonably low. However, in the case of the company in question, it was necessary to maintain an inventory of fifty thousand different stock part items and, in order to maintain inventories at an optimum level, to review ordering quantities at the time of originating each manufacturing order. As about one thousand manufacturing orders were being originated each week by a group of four ordering clerks, the alignment chart approach offered the following drawbacks:

— A substantial amount of time consumed in establishing and revising ordering quantities.
— Difficulties in training the ordering clerks to use the chart accurately, and in training future replacement personnel.

Construction and Use of Reference Charts

The problem was solved by developing a set of charts in the form exemplified in Exhibit 1. The entire set consists of eight pages with two charts per page, each chart representing a monthly usage value and providing a rapid means of reading the economical ordering quantity directly from the set-up cost and the unit piece cost. These costs are shown on the inventory record card along with the economical ordering quantity. The monthly usage figures are determined in one of two ways, depending on the class of part:

1. *Parts with consistently high usage and relatively low cost, and parts primarily carried for repair parts sales.* Monthly usage on these parts is estimated by the ordering clerk, using the history of actual usage as shown on the inventory record card as a guide.
2. *Other parts primarily used in the manufacture of current product lines.* Monthly usage on these parts is a forecast figure based on an annual sales forecast reviewed and re-issued quarterly.

Each ordering clerk was given a set of the charts consisting of eight pages assembled in a coil binder and protected by acetate envelopes. An index tab affixed to each sheet shows the corresponding monthly usage values for quick reference. The eight-page set covers a range of set-up costs from 0 to $200, piece costs from .05 to $135, and monthly usage figures from .1 to 10,000. Some of the charts are used for multiples and fractional usage values as well

ECONOMICAL ORDERING QUANTITIES - MANUFACTURED PARTS

MONTHLY USAGE 1

PIECE COST	SET-UP COST IN DOLLARS 0	1	2	4	7	11	17	26	40	60	90	135	200
.05	55	70	85	105	130	160	190	235	290	350	430	520	635
.10	39	50	60	75	90	110	135	165	205	245	300	370	450
.15	32	41	48	60	75	90	110	135	165	200	245	300	365
.20	27	35	42	50	65	80	95	115	145	175	215	260	320
.30	22	29	34	43	55	65	80	95	120	145	175	215	260
.45	18	24	28	35	44	55	65	80	95	115	140	175	210
.70	15	19	22	28	35	43	50	65	80	95	115	140	170
1.00	12	16	19	23	29	35	43	55	65	80	95	115	145
1.50	10	13	15	19	24	29	35	43	50	65	80	95	115
2.30	8	10	12	15	19	23	28	34	43	50	65	75	95
3.50	7	8	10	12	16	19	23	28	34	42	50	60	75
5.00	6	7	8	10	13	16	19	23	29	35	43	50	65
8.00	4	6	7	8	10	13	15	18	23	28	34	41	50
12.00	4	5	5	7	8	10	12	15	18	23	28	34	41
18.00	3	4	4	5	7	8	10	12	15	18	22	27	34
27.00	2	3	4	4	6	7	8	10	12	15	18	22	27
40.00	2	3	3	4	5	6	7	8	10	12	15	18	22
60.00	2	2	2	3	4	5	6	7	8	10	12	15	18
90.00	1	2	2	2	3	4	5	6	7	8	10	12	15
135.00	1	1	2	2	3	3	4	5	6	7	8	10	12

MONTHLY USAGE 2

PIECE COST	SET-UP COST IN DOLLARS 0	1	2	4	7	11	17	26	40	60	90	135	200
.05	75	100	120	150	185	225	270	330	410	495	605	740	900
90.00	2	2	3	3	4	5	6	8	10	12	14	17	21
135.00	1	2	2	3	4	4	5	7	8	10	12	14	17

EXHIBIT 1

as those shown directly. The basis for this is that the economical ordering quantity varies as the square root of the usage. The chart for monthly usage of 30, for example, is also used for a usage of .3 by dividing the quantity read on the chart by ten, and for a usage of 3,000 by multiplying the chart quantity by ten.

The monthly usage values for each chart are as follows:

Page	*Monthly usage*	*Read .1 Q*	*Read 10 Q*
		Alternate Usage Values	
1	1		
	2		
2	3		
	5		
3	7		700
	10	.1	1,000
4	15		1,500
	20	.2	2,000

Page	Monthly usage	Alternate Usage Values	
		Read .1 Q	Read 10 Q
5	30	.3	3,000
	45	.45	4,500
6	70	.7	7,000
	100		10,000
7	150	1.5	
	220		
8	330		
	500		

It will be noted that each of the three independent variables increases by increments of around 50 percent. In reading the charts, a sight interpolation is made to determine an approximate quantity for cost and usage values between the chart increments. It is not necessary to calculate exact interpolations, as moderate differences in ordering quantities do not affect the costs involved to a significant degree. Using an economical ordering quantity based on a set-up cost, piece cost or usage value which is 50 percent too high, for example, affects the combined cost of carrying inventory, making set-ups and issuing orders by only about 3 percent. A very rough sight interpolation, therefore, should result in an error of less than 3 percent, which is well within the limits of error inherent in the estimates of inventory carrying cost and order processing cost. This is the key to the practicability of the rapid reference charts.

Construction of the charts was simplified by using the following procedure:

1. A chart was made for monthly usage of one in the form shown in the exhibit, except that the quantities calculated from the formula were entered in two decimal places instead of being rounded off.
2. The charts for all other usage values were calculated by multiplying the values on the usage of one chart, as indicated above, by the square root of the new usage values ($\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, etc.). These values were rounded to the nearest whole number for quantities of 50 and under, and to the nearest multiple of 5 for quantities above 50.

Easily Adaptable to Company Situations

The approach outlined in this article can be used to advantage in nearly any inventory control situation requiring frequent calculation of economical ordering quantities or manufacturing lot sizes. The range of values needed, the cost of carrying inventory and the cost of processing order paperwork would, of course, be based on conditions existing at a particular company.

Installing a Standard Material Cost Program

by ROBERT BISSET

MATERIAL COST is the largest element of manufacturing costs in our company, which is a multiplant operation. Manufacturing plants are located in various parts of the country but all productive purchasing is performed by central office personnel located in Detroit.

A large variety of purchased parts of all sizes and materials is required. These parts, which vary from expensive castings of aluminum, iron or zinc to common screws, gaskets, springs, washers, etc., are purchased monthly in quantities ranging from 500 to 500,000 pieces. Suppliers of these parts are chosen carefully; among the prime factors in their selection are freight costs and ability to deliver on schedule. We also manufacture in our plants as many of our own parts as our equipment and scheduling limitations will allow.

This study summarizes the preliminary steps, the coding system and the results obtained when our company installed a standard material cost program.

Preliminary Steps

Prior to the installation of our standard material cost program, the general accounting department maintained the material inventory accounts by plant, by product. Our first step was to examine these accounts and to work out methods by which the new program could be installed with as little disruption as possible to our normal general accounting and accounts payable functions. At that time it was determined that, when our new program was installed, we would have to balance our actual costs by product to the book inventories and then prepare a journal entry establishing the standard cost account and variance account balances.

In regards to purchasing, our objectives were, first, to build into our records and reports information which would enable the purchasing department to do a better job and, second, to assign this department the responsibility for all material variances.

In order to attain our first objective we discussed it in a general meeting with all purchasing agents, being careful not to tell them how to buy or what to buy but, rather, asking how we could, perhaps, aid them to do a better job. This

---

ROBERT BISSET is a Cost Analyst at Holley Carburetor Company of Detroit. He attended Walsh Institute of Accountancy.

meeting greatly improved the relations between purchasing and accounting people. Also, a keen interest in the program by both parties was immediately evident. Since we had found that each buyer desired somewhat different information, due to the wide varieties in materials purchased, we tailored our categories and reports, whenever possible, to the wishes of each one.

In order to attain the second objective, we compiled a list of all the items of purchased inventory, showing part numbers, description, type of material, quantity and cost of the most recent purchase; the last two items to be used merely as a guide for determining proper standards. We also asked the purchasing department to advise us of the standard quantity and price to be used, cautioning that volume based on normal productive buying should be the guide.

Coding System

Our material was coded according to the following principal categories into which it had been segregated:

Codes

1. Raw steel
   - A. Cold rolled steel
   - B. Hot rolled steel
   - C. Stainless steel
   - D. Alloy steel
   - E. Spring steel
2. Aluminum castings
3. Zinc castings

Codes

4. Cast iron castings
5. Miscellaneous castings
10. Screw machine parts, brass
11. Screw machine parts, steel
12. Miscellaneous purchased parts
20. Packaging

Raw steel. In the raw steel category a standard material cost per hundredweight was established. This is the only instance in which other than a unit price per piece was used. A conversion was computed, informing us how many pieces we could make per thousand pounds of steel used. We then compared our unit price against what we were paying or would have to pay for the part if purchased on the outside.

Castings. Castings represent a major item of our material purchase costs. Close controls were established in order to accomplish the following:

1. Fluctuations in the metal markets being frequent, we wished to assure ourselves that our billings to the customers always recovered or credited the cost changes resulting from these fluctuations.
2. Because castings are not uniform in weight, due to engineering changes, and, thus, the piece prices vary, we wished to have correct actual weights of each casting.

3. Our casting vendors were kept as few in number as practicable. This was fortunate from a paperwork point of view, but we wished to assure ourselves that our suppliers were keeping their prices to us in line; we, therefore, processed constant requests for quotations.

Screw machine parts. Our requirements of these parts is enormous, so that the conversion of our accounting for them from manual to tabulating resulted in many savings. Because of our requirements, it was often necessary to have more than one supplier for a part. This resulted in lower prices, but it also required, in many instances, that we had to supply more than one set of tools. Consequently, we conducted studies of various parts for the purpose of answering such questions as: which is greater, the cost of additional tooling or the apparent savings from use of several suppliers? Can we take a chance on only one vendor? These studies resulted in some additional savings.

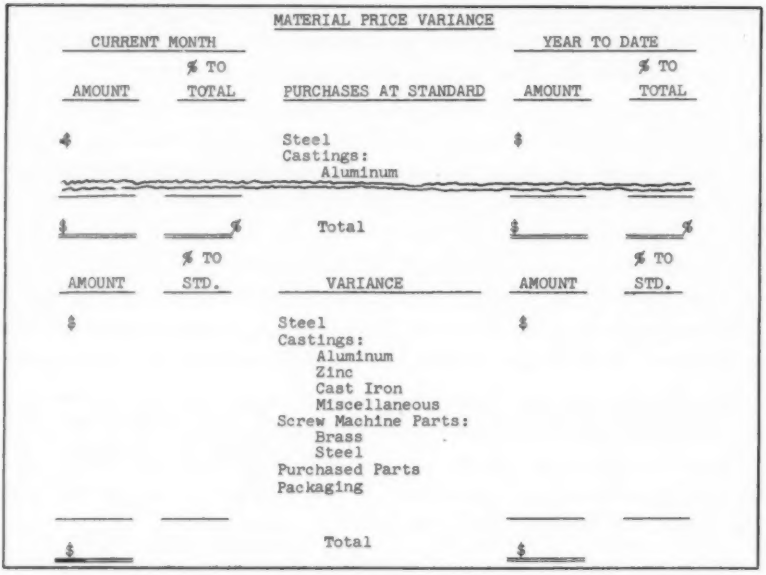
Miscellaneous purchased parts. This category, which comprises all other parts in our material purchases, turned out to be quite interesting. First, the dollar volume was quite high and the need for subclassifications was readily seen. Thus, we gave each part a prefix number. For example, all 5R numbers indicate screws; 7R numbers, plugs; 8R numbers, gaskets, etc.

Packaging. Inasmuch as a large portion of sales volume in our service division is for other than complete assemblies, a tremendous amount of individual packaging was generated. Prior to installing standard cost, this type of packaging had been expensed. Again, using a manual listing of parts, showing how the parts were packaged, our first step was to simplify the numbering system, so that we could utilize our tabulating division. As we progressed with this work, it was very interesting to note that the attitude towards particular cartons changed. Some, thought to be unnecessary, proved to fit special needs. At the same time, we noted instances in which cartons were being misused, that is, they were not being used for the purpose for which they were purchased. We were able to correct this.

Material Price Variance Report; Further Analyses

After selecting the categories, as described above, the first direct results were soon forthcoming from tabulating department. By tabulation of information from invoices and standard material cards, a material price variance tape was prepared. The variances were reviewed and summarized on the report shown on Exhibit 1.

A tabulating run was prepared for our screw machine parts by product, by part number, by vendor. Where two or more vendors supplied the same part,



MATERIAL PRICE VARIANCE

CURRENT MONTH			YEAR TO DATE	
AMOUNT	% TO TOTAL	PURCHASES AT STANDARD	AMOUNT	% TO TOTAL
$		Steel	$	
		Castings:		
		Aluminum		
$	%	Total	$	%
AMOUNT	% TO STD.	VARIANCE	AMOUNT	% TO STD.
$		Steel	$	
		Castings:		
		Aluminum		
		Zinc		
		Cast Iron		
		Miscellaneous		
		Screw Machine Parts:		
		Brass		
		Steel		
		Purchased Parts		
		Packaging		
$		Total	$	

EXHIBIT 1

the buyer investigated the reason for price differentials. As the tabulating runs were studied, the re-occurrence of several different vendors became quite obvious. The tabulating department had applied a vendor code number to all accounts payable punched cards. This was then reproduced to the current month's standard material punched card and an analysis of individual vendors by part number, category, actual and standard cost was tabulated. This proved quite helpful to our purchasing department, as the same or similar parts with various selling prices were readily recognized.

After several months of operations, when the amount of variance by product began to show up, products themselves were studied. Each product line became a realm of its own. In segregating by products, the amount of parts to be analyzed was reduced to the point that individual attention could be given to major items.

We are subject to many requests from our sales department and estimating department for material costs and costs of individual parts, assemblies and complete assemblies. Our standard material cost program has proved to be of tremendous value in enabling us to answer questions quickly and accurately on this important accounting matter.

Financial Leases Belong on the Balance Sheet

by JACK RHODES

WITH THE INCREASING POPULARITY of lease financing, the accounting profession today is confronted with a serious challenge, that of providing adequate disclosure for this type of lease which has most of the characteristics of a debt instrument. The purpose of this article is to examine present accounting methods as they relate to lease financing to determine whether or not the accountants have kept pace with the growing challenge and, in this connection, to probe the following questions:

1. Do current accounting procedures provide adequate disclosure of leases on the balance sheet?
2. Is lease financing a form of debt financing and should the lessee's commitment be included on the balance sheet as a liability and the right to use leased equipment as an asset?
3. Have the weaknesses of accounting treatment of financial leases contributed to the rapid growth in their use?

One of the basic responsibilities of accountants is to make sure that financial statements meet adequate standards of disclosure. A great degree of emphasis is placed on this, because of the importance accorded published financial statements: (1) by investors in making decisions and in exercising control over management, (2) the management, itself, (3) grantors of credit, (4) labor leaders and (5) other interested parties. The use of a footnote to disclose lease obligations, which is prevailing current practice, may well be questioned in the light of this responsibility.

The indenture of lease is a legal document representing the results of negotiations between two parties interested in a lease arrangement and setting forth the relationship between them. In analyzing the use of this legal document for financing purposes, however, one writer warns that its specific provisions are important only as they present the desires and purposes of the lessee and the lessor. Any analysis of the specific lease provisions, he maintains, should not be based upon the legal terms included in the document but on the prac-

---

JACK RHODES, Peoria Chapter, 1957, is Eastern Credit Manager in the Domestic Credit Department of LeTourneau-Westinghouse Company. He received his B.A. degree in Business Administration from the University of Washington and his M.B.A. degree from Bradley University, in 1960. While at Bradley, Mr. Rhodes did research work in the accounting treatment of leases.

tical economic results the parties intend to achieve.[1] The truth of this observation is an essential consideration in connection with leases used as financing media for the acquisition of productive assets.

Similarity of Arrangements

The method of setting the rental may be revealing. As in any investment, the party providing the funds attempts to receive a rate of return consistent with the risks he assumes and in line with alternative investment opportunities available to him. In establishing the rental amounts in a lease agreement, the lessor gives primary consideration to these two factors. Where the entire investment is expected to be amortized during the initial term, the rental may be established by use of annuity tables. For example, if the lessor wishes to rent a piece of equipment now worth $7,360 to the lessee for a period of ten years and desires to make a six-percent return on his investment, the annuity tables would tell him that he should charge an annual rental of $1,000.

Perhaps more than any other characteristics, the following two elements required by the lessor to make his investment as close as possible to an annuity identify the lease as a financing instrument:

1. "Net lease" provision.
2. Credit worthiness of the lessee.

When the above two elements are primary considerations affecting the decision as to whether the lessor should engage in the transaction, it appears from an economic standpoint that the lease agreement becomes a debt instrument. These two elements, along with the other similarities of leasing to debt financing, should be considered by the accountant in deciding how the lease agreement should be disclosed in the balance sheet of the lessee and how rental payments should be handled in the income statement.

All lease agreements should include the obligations of both the lessor and the lessee with respect to payment of expenses related to the leased piece of equipment. So that the lessor can predict his return on investment more closely in accordance with annuity tables, it is essential that a lease agreement of the financing type include a net lease provision, under which all expenses relating to the leased unit would be paid by the lessee. These expenses would include such items as repairs and maintenance, insurance, taxes and assessments. Such a provision allows the lessee to resemble more closely the actual owner and it

[1] *Long-Term Leases—Problems of Taxation, Finance and Administration,* Albert Cohen, Michigan Business Studies, Bureau of Business Research, University of Michigan, Ann Arbor, Mich. Vol. XL, No. 5, p. 18.

permits the lessor to be in about the same position as if he had merely loaned the money to the user for purposes of purchasing the piece of equipment.

The credit worthiness of the lessee as a factor in negotiations is a consideration in leasing which brings it close to other types of asset financing. Just as the acceptance of a company's debt instruments, such as bonds and notes, depends upon the company's character, capacity, and capital, the primary factor in a financing lease is the degree of the lessee's credit worthiness, which likewise depends on these three basic elements. The importance of the lessee's credit standing is one of our most convincing bits of evidence that lease financing is a form of debt financing. Although the yield is slightly higher on leases than on bonds, this does not give us the answer as to why investors are willing to assume the entire capital risks. Gant's answer[2] is that the investment is regarded as a loan based upon the lease and considered as a general credit obligation of the company.

In addition to a net lease provision and the credit worthiness of the lessee, there are several other characteristics of the financing lease which are peculiar to this type and cause it to resemble debt financing.

A basic element is that lease financing is designed to give the lessee the right to the use of an asset during its entire life or, at least, a major portion.

In addition, whereas other types of leases claim the advantage of legal differences as their primary reason for being selected over ownership, a financing lease is entered into on financial considerations chiefly. When a company finds itself in a position where an addition to fixed assets is necessary, leasing represents one of the several alternatives the company's management may consider. In making the decision, one factor is the cost of financing the assets in relation to earnings of total capital invested in the enterprise, with the objective of achieving a financial leverage for the stockholders. The appropriate selection is the one which maximizes the investor's return. Although management has considerable latitude with respect to how it will arrange to obtain the use of fixed assets, these is little choice as to whether to use them at all—this is a dictate of necessity. In order to continue as a going concern, the manufacturer must have plant and equipment, the retailer must have store fixtures, and the contractor must have construction equipment, whether leased or bought.

Another basic consideration incorporated in a financing lease is that of providing for a lease term protected against cancellation. The length of this basic term is determined by the life of the asset and is usually established at a period

[2] "Illusion in Lease Financing," Donald R. Gant, *Harvard Business Review*, March-April, 1959.

somewhat shorter than the expected life, thus allowing for a residual value of the piece of equipment at the expiration of the original lease.

Difference Found in Remedies of the Lessor

Probably one of the major reasons for the present differences in the treating of debt financing and lease financing by accountants is the legal differences with respect to the remedies of the lessor as contrasted with the remedies of the creditor in event of default, bankruptcy, or reorganization of the lessee or debtor. The lease agreement is terminated in event of default by the lessee and the lessor has the right to enter the premises and prevent further use of the equipment by the lessee, following proper notice. The lessor may sue the lessee for all rents and damages accrued.

In event of bankruptcy, the trustee of the lessee has the privilege of assuming the lease if it appears advisable and may continue to abide by the existing terms or altered terms. If the trustee decides to reject the lease, the maximum claim of the lessor is one year's rental from the date the lessee surrendered his premises. If reorganization occurs, the lessor is entitled to a maximum claim of three years' rental. Naturally, the lessor, in the case of the lessee's bankruptcy, when the trustee rejects the lease, and in reorganization, may repossess the leased equipment.

If a lease is carefully prepared and includes a provision for termination at the option of the lessor in event of financial difficulties, such as those discussed in the preceding paragraph, the lessor may completely escape legal proceedings. However, inasmuch as the full cost of the leased piece of equipment is being carried by the lessor, it may be possible that the current value of the unit at repossession date will be considerably below his unrecovered investment, even though there is immediate repossession after financial difficulty takes place.

Similarity of Instruments

Several of the characteristics of financial leases are similar to those of debt instruments. It is with respect to the following similarities that financial leases have with debt instruments, from which can be developed a basis for contention that lease financing is actually a form of debt financing:

Commitment for a series of payments over a fixed period of time—Both lease contracts and installment contracts for the purchase of equipment represent obligations on the part of the company which employs the assets involved to make payments of specified amounts of money at certain dates in the future.

Whether the commitment is reflected in the balance sheet as a footnote describing a lease arrangement or is listed in the liability section as a note payable, the obligation to pay the periodical amount will be present.

Equivalence of rental payments to interest and return of capital—On each payment which a debtor applies to a note or contract payable, it is known specifically by both the debtor and creditor how much will be used to reduce the principal outstanding and how much represents interest expense to the debtor and interest income or return on investment, to the creditor. Rental payments are made up of these same two components—interest and return of original investment. It may be contended, correctly, that no distinction is made by the lessee in recording rental expense nor by the lessor in recording rental income. Nevertheless, inasmuch as the rental payments are determined through financial annuity tables, with little consideration for the going rental rates on comparable equipment, we must conclude that rental payments are actually equivalent to installments against purchased equipment or payments of principal and interest, even though in practice they are not recorded as such.

As already discussed, if there is a net lease provision, the lessee assumes many of the obligations of the owner and his position in this respect resembles the debtor under a conventional loan agreement. Although neither owns full equity in the asset, they both have the responsibilities usually associated with ownership.

Maturities—At the maturities of both debt financing and lease financing, the investor will have fully recovered his investment. Following the maturity date of the debt instrument, the debtor's obligation expires and he assumes full equity in the assets that were being financed. Where the investor has held a conditional sales contract, title also passes at the maturity date to the debtor. In lease financing, these same results may take place if the lessee elects to purchase the leased asset at the maturity date of the basic lease period.

False "Improvement" in the Balance Sheet

An important advantage of leasing advanced by leasing companies in promotion of their plans is the method by which leases are now reported in the balance sheet of the lessee. In this connection, National Equipment Rental, Ltd., in a promotional pamphlet recently released, listed several "plus factors of leasing." Included in this list were the following:[3]

[3] The National Rental Plan, 1960.

1. Conserves working capital.
2. Permits greater turnover of working capital.
3. Conserves credit.
4. Financial statement unencumbered.
5. No notes payable.

It appears that these advertised "plus factors" stem from the fact that leases are either reflected in the balance sheet in the form of a footnote or are not mentioned. With regard to conservation of and greater turnover of working capital, when compared to debt financing, part of these advantages would be due to the fact that leasing requires no down payment. No deduction, other than the first rental payment, is made from the lessee's working capital when the equipment is first obtained. The result is that the company is able to retain a larger portion of funds as working capital, as compared to the ownership alternative. Still, to a great degree, the favorable effect on working capital is due to the differences in the method by which accounting currently reports debt financing and lease financing on the balance sheet. Whereas the balance sheet would show as a current liability the total amount due on the debt instrument in one year, nothing would appear in the current liability section to indicate the lessee's obligation with respect to the rental payments due within one year. Hence, lease financing "improves" the current ratio, quick ratio, liabilities-to-equity ratio, fixed-assets-to-equity ratio, and the rate of return on total investment.

Perhaps, the more experienced financial statement reader looks beyond the figures in the balance sheet and realizes that, as long as the equity in the fixed assets in use does not fully belong to the user, there will be an obligation to make payments against them. This obligation prevails whether the assets are subject to a lease agreement or are being financed under a debt instrument. To an unskilled reader of financial statements, however, the difference in the accounting treatment of a lease agreement and a debt instrument may be misleading to the extent that he may consider leasing fixed assets as advantageous solely on the basis of its omission from the figures in the balance sheet.

Rules and Remedies

With regard to disclosure of leases in finacial statements of lessees, the Committee on Accounting Procedure of the American Institute of Certified Public Accountants recommended the following in its 1953 codification of bulletins issued to that date:[4]

[4] *Accounting Research Bulletin No. 43—Restatement and Revision of Accounting Research Bulletins,* Committee on Accounting Procedure, American Institute of Certified Public Accountants, 1953, pp. 126-27.

". . . where the rentals or other obligations under long-term leases are material in the circumstances, the committee is of the opinion that:

"(a) disclosure should be made in financial statements or in notes thereto of:

(1) the amounts of annual rentals to be paid under such leases with some indication of the periods for which they are payable and

(2) any other important obligation assumed or guarantee made in connection therewith;

"(b) the above information should be given not only in the year in which the transaction originates but also as long thereafter as the amounts involved are material; and

"(c) in addition, in the year in which the transaction originates, there should be disclosure of the principal details of any important sale-and-lease transaction."

The requirements of the Securities and Exchange Commission for the disclosure of financial leases are no more strict.

The evidence we have furnished so far supports the opinion that financing leases, as a form of debt financing, should be included in the body of the balance sheet. Regardless of the degree of information provided by present practice, it appears that the use of a footnote is inconsistent with the manner in which normal financing devices are treated. If we, by the use of a footnote, exclude all of our leased fixed assets and our obligations to make payments against them from our balance sheet, why do we not exclude all of the assets we are purchasing under a conditional sales contract and the obligations against them? In neither case, do we possess title.

If accounting procedure is revised so that reflecting the lease commitment as a liability becomes a requirement, we also have the problem of reflecting the leased equipment on the balance sheet as an asset. However, we need to look no further than the basic accounting concept now in use for stating balance sheet values—the going concern concept. Under this concept, the primary justification for the value of an asset relates to its having been irrevocably dedicated to carrying on of the objectives of a business and the assumption that it will remain in use as long as it serves this purpose. Since, under this concept, it is assumed that the business entity has continuity of life, the liquidation or market value at statement date is considered as of secondary importance. In applying this concept to a leased piece of equipment, the user should not be concerned with the fact that he does not possess legal title and would forfeit the unit to the legal owner in event of liquidation. He should consider his economic need for the piece of equipment and the fact that this need will

always be present as long as his business remains a going concern. From this viewpoint, there appears to be as much justification for including a piece of leased equipment on the balance sheet as an asset as there is for including a piece of equipment to which the user holds legal title.

As a solution to the problem of treating financing leases consistently with conventional types of financing, some accounting writers have supported a proposal for placing leases on the balance sheet by showing as a liability the total lease commitment discounted at an approprate rate of interest and, as an asset, an equal dollar amount. One writer reported that his company had achieved a "first" by including in the balance sheet all its leased assets and related long-term lease commitments. This change in reporting came about as a result of the feeling by the company management that the footnote, which was previously used, was wholly inadequate for anyone analyzing the company's financial statement.[5]

Are Accountants at Fault?

It may well be that weaknesses in accounting presentation in financial statements have contributed to the rapid growth in the use of the lease primarily as a financing device. Related criticisms have been directed to the accounting profession because its standards have proven inadequate to cope with the rapid adaptation of the lease as a financing device. The principal allegation is that, although the capacity with which a company may enter into lease agreements is based primarily upon its credit standing, current practice permits leases to be reflected on the balance sheet in the form of a footnote or, in some cases, permits their omission, with the result that a credit appraisal by the conventional method would be distorted. There is a growing awareness in most fields of business that improvement in handling of presentation of lease arrangements is definitely necessary, but no revisions to present accounting procedure have so far been made. Suggestions for improvement fall into two main types. The first is lease capitalization, under which the total rental to be paid is discounted by an appropriate rate of interest and is shown in the balance sheet for this amount as a liability, an equal dollar figure being used as the asset valuation. The other is inclusion of more meaningful facts in the footnote.

A Solution Needed

Based on the evidence presented, our analysis in the foregoing pages suggests answers to the three questions posed at the start. These answers are:

[5] "Including All Leases on the Balance Sheet—A First," Kenneth R. Rickey, *N.A.A. Bulletin*, December, 1959.

1. The footnote, now favored practice, is not adequate for the disclosure of lease arrangements. It may serve from a legal standpoint. However, with the rapid growth of the use of leases, the primary function of which is to stand in lieu of financing, reconsideration of practice is necessary. From an economic standpoint the use of a footnote means that the company is omitting from the asset side of the balance sheet land, buildings and equipment which perform a significant function in a business on a long-term basis. In this respect, the question of title to the assets is irrelevant; we should consider the right to use the leased property as an asset. As to the liability side of the balance sheet, inasmuch as a leased asset is useful to a going concern all of its economic life, it follows that any related commitment to pay out funds should be included as a liability. We should not view this commitment from the standpoint of the minimum amounts payable in event of financial difficulty; we should consider it as an obligation which will be in effect as long as the asset serves a useful function to the lessee.

2. Leasing is a form of debt financing and should be reflected as such in the balance sheet. Although only leases in the legal sense, these instruments have as their primary purpose the acquiring of assets without the investment of equity capital. This is also the purpose of long-term debt. The accounting profession must consider all of the similarities between lease financing and debt financing and must, correspondingly, treat them in a consistent manner on the balance sheet.

3. Leasing offers several advantages other than its effect upon the balance sheet. However, it is the author's belief that the accountant's present method of handling leases has been a primary contribution towards its popularity and the corresponding recent growth of leasing companies.

Because of the common method by which lease arrangements are reflected on the balance sheet, it is our feeling that accountants, public and corporate alike, have not kept pace with the problems related to lease financing. However, articles written by members of the profession do indicate a growing awareness of the situation. There have been strong recommendations for placing the leases and the leased assets on the balance sheet. Perhaps legal obstacles have prevented progress beyond this point. Nevertheless, it is the responsibility of the accounting profession to cope with the problem. Through research, perhaps, it may be possible to furnish recommendations which will provide a definitive solution to this urgent problem.

Beyond These Covers

Books

Cost Administration: Cases and Notes

Earl D. Bennett, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1960, 606 pp., $10.

Subtitled "Accounting for Cost Control and Product Decision", this volume provides 37 cases arranged by topics, among them "cost flows and reports" (Cases 4 to 13), "budgeting control" (Cases 19-25), and "data processing" (Cases 34 to 37). Case 9 involves direct costing and is followed by a 7-page "note" on this method. The cases represent manufacturing operations for the most part but publishing, research, a club and other nonmanufacturing lines are also included.

Profit Planning through Volume—Cost Analysis

John Y. D. Tse, MacMillan Co., 60 Fifth Ave., New York 11, N. Y., 1960, 240 pp., $7.95.

Largely devoted to case illustrations, a principal objective embodied in this text is, in the words of the author, "to show, through analysis of actual business problems, a variety of important uses of volume-cost studies." These studies are related, in the course of the book, to profit planning, capital outlay decisions, make-or-buy problems, pricing, cost control and, more in particular, budgeting.

Corporate Financial Management

Raymond P. Kent, Richard D. Irwin, Inc., Homewood, Illinois, 1960, 851 pp., $10.

It is the exceptional management man, accountant or otherwise, to whom many aspects of corporate financing are not mystifying. This thoroughgoing text, written primarily for college students, may be serviceable also within the management group. The book is sectionalized largely by sources of finances, e.g., retained earnings, bonds, "without securities," etc.

Accounting Trends and Techniques

American Institute of Accountants, 270 Madison Avenue, New York 16, N. Y., Paper Bound, 1960, 14th Edition, 274 pp., $18.

This study offers thoroughgoing indications of current practice in financial statement presentation. Each of many aspects of balance sheet, profit and loss statement, surplus statement, and auditors' report is given statistical summarization as to principal alternatives followed, for the year 1959, comparative with earlier years (in some cases to 1946). Illustrations are introduced from the statements of the 600 companies on which the study is chiefly based.

Preparation of Statement of Sources and Application of Funds by the T-Account Method

Richard J. Bannon and Edwin Cohen, Southwestern Publishing Company, Cincinnati, Ohio, Paper Bound, 1959, 30 pp., $.60.

This proposed method of preparing application of funds statements, the now more frequently used "third statement" (besides balance sheet and profit and loss statement), is offered as a replacement for the columnar worksheet method. The T-Account method is regarded as more readily understood and informative. It is explained and illustrated by the authors.

Financial Incentives for Management

Richard C. Smyth, McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y., 1960, 309 pp., $8.50.

Starting with attention to the difficult preliminaries of organizational analysis, evaluation of particular managerial positions, and the setting of salary ranges for these

positions with all their imponderables, the author proceeds to types of plans. Executive, supervisory and salesmen's incentives are all considered, together with stock option or purchase plans and deferred compensation.

Standard Manual of Accounts for the Food Chain Industry

Controllers Conference, National Association of Food Chains, 1025 Connecticut Ave., N. W., Washington 6, D. C., Paper Bound, 1960, 55 pp., $5.

The work of a committee established in 1956, this new industry manual offers a responsibility center setup rather than a full schematic profit and loss, the intention being to concentrate interest on the areas where management inspects those expense elements which are out of line and then, working through the executive responsible, realizes greater profit.

Handbook of Building Operation—1960

Buildings, 427 Sixth Ave., S.E., Cedar Rapids, Iowa, Paper Bound, 80 pp., $1.50.

More — much more — than accounting is dealt with in these pages but the small section on "Accounting System for Property Managers" nestled among the operating information is practical in character and the remaining data highly informative on real estate management.

How to Determine the Total Cost of Your Employee Benefit Program

Michael T. Wermel & Geraldine M. Beideman, California Institute of Technology, Pasadena, California, 1960, Paper Bound, 55 pp., $2.50.

Subtitled "A Guide for a Company Survey," this study provides means of relating benefit plan costs to factors upon which benefits are provided and on an over-all basis also. One chapter deals with the uses of the cost figures and suggests four general ways of presentation: in total, per employee per year, percent of payroll and cents per hour.

Payroll Data Processing Handbook

Gille Associates, Inc., Book Tower, Detroit 26, Michigan, 1960, Looseleaf, 104 pp., $10.

One of a series of "application" handbooks containing specific cases and related procedures, this volume deals with a variety of aspects of what its publisher refers to as the "bread and butter application" of data processing, including (among 22 topics) records of employee earnings, payroll reports by computer, deduction accounting, and reconciliation.

Glossary of Terms in Computers and Data Processing

Berkeley and Lovett, Berkeley Enterprises, Inc., 815 Washington St., Newtonville 60, Mass., Paper Bound, 5th Edition. 1960, 90 pp., $3.95.

More than 870 terms are included in this virtual dictionary of electronic data processing, with every effort made to define in simpler terms than the word being defined. It runs from "absolute address" to "zone punch" via the detail of the new vocabulary of electronics becoming gradually familiar to the accountant.

Fringe Benefits and Their Federal Tax Treatments

Hugh Holleman Macaulay, Jr., 1959, 246 pp., $6.50.

"Tax favor" accorded to fringe benefit compensation—deferral (as with pension funds), escape (as with group life insurance) and applicability of capital gains rates (as with certain lump sum benefits in deferred profit-sharing plans)—are distinguished in this book, which gives broad and extensive treatment to the entire situation of fringe benefits and their taxability.

Modern Approaches to Production Planning and Control

Robert A. Pritzker and Robert A. Gring, Editors, American Management Association, Inc., 1515 Broadway, New York 36, N. Y., 1960, 445 pp., $9.

Twenty-one separately authored papers and four appendices make up this book in an accounting-related area. Relevant titles include, "Inventory Policy As It Affects Production Planning: The Control of Stores Inventory" and, "The Special Importance of the 'Make-or-Buy' Decision." Three industrial company case studies conclude the work.

Technical Communication

George C. Harwell, MacMillan Co., 60 Fifth Ave., New York 11, N. Y., 1960, 332 pp., $3.75.

The many forms which engineering-oriented technical writing and oral communication take—letters, reports (formal and informal), articles, addresses, etc.—are given individual chapters of this book, followed by a section devoted, first, to use of illustrative material and, second, to grammar and rhetoric. The treatment is informative for others, besides engineers, concerned with effective expression in business communication.

Sample Design in Business Research

W. Edwards Deming, John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y., 1960, 517 pp., $12.

Concerned with the employment of sampling so that it will accurately provide internal and external information helpful in management of the business, the author of this book has reserved the greater part of theory till the last, where it may be more relevant to the reader. Chapter 8 offers two examples in sampling accounts, one a "quick study of accounts in ledgers," the other a "large-scale study of freight shipments in multiple locations."

Introduction to Matrix Analysis

Richard Bellman, McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y., 1960, 328 pp., $10.

A text on "symmetric matrices and quadratic forms, matrices and differential equations, and positive matrices," together with their "use in probability theory and mathematical economics," this book, in the words of its descriptive notice "also presents part of the theoretical treatment of the use of matrices in the solution of differential equations by means of digital computers."

How to Chart

Walter E. Weld, Codex Book Co., Norwood, Massachusetts, 1959, 218 pp., $3.14

Types, nature, and uses of graphs are presented here, simply, against an implicit background of business applications. The viewpoint is that of providing instruction for beginners and "good" vs. "bad" charts are distinguished by examples and comments upon them.

A Study in the Theory of Investment

Trygve Haavelmo, University of Chicago Press, Chicago 37, Illinois, 1960, 221 pp., $5.

The final section of this treatment—"Investment Behavior in a Market Economy"—approaches most closely to the practical than any other in this volume, which is, in a sense, not very close. In another sense, the entire volume, despite free use of formulas, is broadly practical in its objective of looking for "relation between investment activity and the really fundamental laws of economic behavior."

Office Management in the Small Business

American Institute of Certified Public Accountants, 270 Madison Ave., New York 16, N. Y., Paper Bound, 1960, 84 pp., $3.50.

One of a series of booklets describing management services by certified public ac-

countants, this treatise is directed primarily to C.P.A.'s themselves. It also deals topically with such generally pertinent matters as clerical work measurement standards, forms control, etc. It closes with several case studies of how particular office management service assignments were conducted.

Bibliography for Office Management

National Office Management Association, Willow Grove, Penna., Sixteenth Edition, 1960, Paper Bound, 74 pp., $5.

Covering the period from May 1959 through April 1960, this edition of a now well-known annual bibliography references over 550 magazine articles and some 70 books, as well as relevant technical films. Each of these types of materials is given a separate section. In prior years, the bibliography has been included in an issue of the "Office Executive" but is published separately this year. (Many N.A.A. articles find a place in the listings.)

Operating Results of Department and Specialty Stores in 1959

Malcolm P. McNair, Harvard Business School, Soldiers Field 63, Mass., Paper Bound, 1960, 127 pp., $6.

A now famous annual in the retail field, this study provides data on sales and expenses related to relevant bases (as sales per square foot of total space), such as are sought in many lines of business in which they are not available. Trends are identified in comparisons with 1958 and, occasionally, earlier years. Data are segregated by size groups determined by sales volume.

Budgeting for Better Schools

Ovsiew and Castetter, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1960, 338 pp., $7.95.

School administration has grown to be a [illegible] of considerable proportions and the budget has become not merely the definition of allowed expenditures but also a tool of planning and policy. This book ranges widely and readably. An interesting table on pages 84 to 86 indicates to what extent "budget forms" are state prescribed, although action is local.

1959 Statement Studies

Robert Morris Associates, Philadelphia National Bank Building, Philadelphia 7, Pa., Paper Bound, 1960, 237 pp., $10.

For the information of credit granters, there are offered in this thirty-eighth edition (1923 was the first), information on balance sheets and operating ratios in 154 lines of business—manufacturing, wholesale and retail. Each page is devoted to a particular line and columnized by size groups, revealing percentages for components of balance sheets, percentages to sales for income statement elements and a variety of interpretative ratios.

Rules for Alphabetical Filing

American Records Management Association, c/o William Benedon, Lockheed Aircraft Corp., P.O. Box 551, Burbank, California, Paper Bound, 1960, 65 pp., $4.

How to file for finding is the key problem. Rules 1 to 52 are offered in this publication, 1-21 concerning the "filing unit" and 22-52 concerning the "avenue of entrance". Instructions for typing the file identification are given in a closing section.

Correction

Planning and Justifying Capital Expenditures

The note on Page 95 of the *N.A.A. Bulletin* for October 1960 cited the name of the editor of the above title incorrectly. He is Arthur Lesser, Jr.

NATIONAL ASSOCIATION OF ACCOUNTANTS
NAA
1919